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NEWSPAPER

NEWS IN BRIEF

Telex-IBM Hearing Set for Sept. 11

ST. PAUL, Minn. – The U.S. District Court for the District of Minnesota has rescheduled the hearing on Telex Corp.'s motion for a preliminary injunction against IBM to Sept. 11.

If the preliminary injunction is granted, users would be unable to procure equipment from IBM on extended-term plan and fixed-term plan. The injunction would also enjoin IBM from taking orders for or selling units "in a bundled condition." The 158 and 168 are currently offered with bundled memory.

IBM had requested an extension of 30 days to respond to Telex's brief in support of its motion for preliminary judgment, but the court denied that request and granted a 10-day extension.

Reagan Signs Legislation Allowing 4 New Data Centers

SACRAMENTO, Calif. – Gov. Ronald Reagan has signed legislation that allows the creation of four new data centers in the state as part of the master plan to consolidate computer operations.

Data processing operations in the state will be centralized around four centers – business and services, state colleges, law enforcement and revenue. A fifth, human relations, is scheduled to be set up later.

Funds totaling $30 million for operation of the data centers have been approved and included in the new state budget.

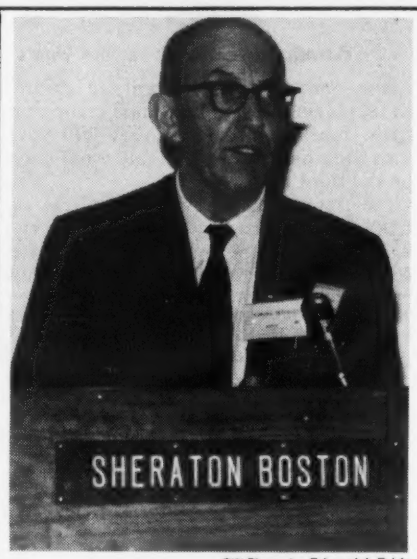
DP consolidation is expected to save the state $185 million in the next five years.

G. Lee Smith, state data processing officer, said the first IBM 370/165 has been installed at the Department of Public Works and will be the beginning of the business and services center.

Requests for information on technical capability have been sent out to 1,000 firms as part of a competitive procurement program to secure other equipment for the centers.

The legislation, sponsored by Sen. Stephen P. Teale (D-West Point), was passed by the Assembly by 67-2 and the Senate 29-1.

On the Inside This Week



CW Photo by Edward J. Bride

Edmund Berkeley, ACM founder, "addresses" the association's 25th anniversary dinner.

Founder Hits Social Role

ACM Blasted for 'Neglect'

BOSTON – It is a "gross neglect of responsibility" that the Association for Computing Machinery (ACM) does not have committees investigating whether computer applications are good or evil, according to the founder of ACM, Edmund C. Berkeley.

Committees should be formed to investigate how computers could be used to increase the good of society, Berkeley told attendees at the association's 25th Anniversary Dinner here last week. He called the Special Interest Group on Computers and Society a "sample of tokenism."

Social Conscience

He also encouraged DP professionals to use "social enterprise" to head off his prediction that mankind will be extinct in 500 years. Use of nuclear weapons and irreversible environmental changes, such as an increasing amount of carbon dioxide in the atmosphere, make the situation "too hard to analyze," he said.

Predicting that vested interests of large corporations would "checkmate" any possible solutions, Berkeley called for the formation of an "Association for the Prevention of Doomsday."

The use of computers in the Vietnam war "makes me ashamed of belonging to the computer field," added the president of Berkeley Enterprises and editor/publisher of *Computers and Automation* magazine.

Continuing his theme, he criticized Honeywell for its "atrocity engineering" in designing anti-personnel bombs.

Founders Honored

The nine ACM founders were honored at the special dinner. Two of the nine are deceased, and the other seven were present for the affair.

Berkeley is credited as "the founder," since it was he who invited the others to a meeting of a Temporary Committee for an Eastern Association for Computing Machinery in New York in 1947.

The others are:

- Dr. Franz Alt, now with the American Institute of Physics
- Dr. Harry E. Goheen, Oregon State University
- Dr. John Mauchly, Dynatrend
- Dr. John H. Curtiss, University of Miami
- R.V.D. Campbell, Mitre Corp
- Dr. Richard Taylor, IBM.

The deceased members are T. Kite Sharpless, founder of Technitrol Engineering Co., and Charles B. Tompkins of UCLA and the National Bureau of Standards.

Virtual Memory Systems Score High Marks in 370/145 User Tests

By Don Leavitt
Of the CW Staff

BOSTON – IBM 370/145 users who field-tested OS/VS1 this spring found throughput equal to or better than they were getting under OS/MFT, an IBM spokesman reported last week. But she then indicated the test sites might not have loaded the new control program enough to really test it.

The eight installations had real main memory capacities ranging from 160K bytes to 512K bytes, with most at 256K, Diana Rode of IBM's Field System Center told an overflow audience at the ACM '72 session on practical experience with virtual memory systems.

IBM Optimistic?

The tests showed that IBM probably was optimistic when it announced earlier that users with 160K byte real memories could use OS/VS1. The one user with that size machine had his throughput degraded by the system.

The 2314 disk systems used by five of the installations were fast enough to handle the users' swapping needs, but they averaged only 3- to 5 page/sec during the three-month test. The "surprisingly low" paging rate was probably due to user reluctance to put any serious programming effort into working with a system which was not then "and might never become" an announced product, she said.

In any case, 3330 disk systems appear adequate to handle the faster paging rates that will be required once users begin to fully exercise the system, Rode noted.

The users in the test represented a spectrum of interests with a "good mixture" of scientific and commercial work to be done, she said, and they accumulated some 3,000 hours of operational experience with the system.

Users found OS/VS1 easy to install and extremely compatible with their then-current MFT-oriented application programs. Most indicated they would continue to use the virtual system as their production environment, she said.

An average of 18 hours between unscheduled Initial Program Loads, proved the basic reliability of OS/VS1, she said. In addition, operations people found the system had better functional capabilities than MFT.

Large jobs were accommodated immediately, for example, instead of being delayed until two partitions could be "dried up" and the space restructured as one partition, she noted.

Users Unaware

Programmers were pleased with faster test turnaround times than under OS/MFT, but they were generally unaware of how virtual memory was controlled or how it could be better utilized by them, she added.

Richard Hill of Honeywell told the ses-

(Continued on Page 2)

Independents React to IBM 370s With Product Changes, Leases

By Edward J. Bride
Of the CW Staff

Users who expressed a "wait and see" attitude after IBM made its new product announcements are getting plenty to look at.

The independents have reacted with price/performance improvements and new capabilities for System/370 devices, including reduced rates for virtual memory capability.

Last week, Itel announced two significant developments for possible virtual memory users, including a new lease plan. The Itel announcement came only days after Telex offered a free virtual memory upgrade for leasing customers of 370 models 155 and 165 (see page 27) and other savings.

An Itel spokesman said the company plans several more announcements on new plans and products to give users "superior price/performance."

In the software area, Applied Data Research (ADR) said two of its proprietary products can aid in paging, thereby assisting virtual operation.

ADR explained – programs will be automatically divided into pages, under virtual operating systems, and that the original placement of statements within a program directly affects page swapping between real and virtual storage.

With ADR's Metacobol, a report can be used to identify the most active Cobol paragraphs, so they can be placed together in the source. Thus the paragraphs will reside in as few pages as possible in "real" memory, ADR said.

The other ADR product, Autoflow, can assist a user in restructuring statements to minimize transfer of control between pages.

Disk Enhancements

In the disk drive area, Itel announced an enhancement to its soon-to-be-delivered 7830/7330, a replacement for the IBM 3330. The new Itel unit will be equipped with Sixteen Drive Addressing, allowing attachment of up to 16 spindles on a single controller.

Other disk manufacturers have also expressed plans to double the capacity of controllers, to handle up to 16 spindles like the new IBM 3830-2.

Memorex also said it planned a doubled capacity for its 3330-type controller, bringing it up to 16-spindle performance.

(Continued on Page 2)

Numberwise...ACM Celebrates Its Most Successful Conference

By Edward J. Bride
Of the CW Staff

BOSTON – The Association for Computing Machinery has started its "second 25 years" with its most successful conference in five years, judging by numbers of attendees and technical papers.

Over 1,500 persons attended last week's annual conference here, a 25% improvement over New York's 1970 meeting. A higher proportion of non-member attendees and increased participation by special interest groups and committees were cited by ACM officials as chief factors in the higher numbers.

The comprehensive technical program, with a two-volume *Proceedings* covering some 1,200 pages, was criticized by a few members for lack of relevance, but of the 100 attendees at a member-officer forum, 80% felt the program technically valuable.

A commercial program, held in lieu of exhibits, featured a dozen software companies describing their products, and the committee planning ACM '73 may repeat this part of the conference, ACM said.

While the commercial program was 100% software, including the Monday evening Presidents Panel on ideas for marketing, (see page 29), the technical side also featured sessions on personnel management, security and virtual memory.

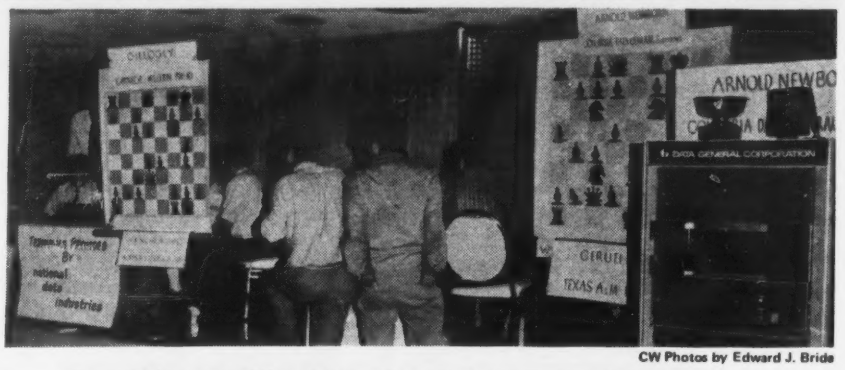
These topics, too, were dominated by the software aspects, which is the usual orientation of ACM meetings, sources agreed.

Chess Tournament

Because of the international chess championship and the current fad toward chess playing, the third annual computer chess tournament drew about 200 persons each night, with standing room only on the third night.

The "tournament" was "won" by a CDC 6600 operated by students at Northwestern University, but a three-way tie for second place is unresolved. Operators played until 4 a.m. last Wednesday, according to conference chairman Adrian Ruyle, and will continue to play intermittently via phone lines until the tie is finally resolved.

Conference officials flew International Chess Master David Levy from Scotland, so he could moderate and narrate the four simultaneous games.



CW Photos by Edward J. Bride

Competition was stiff at this year's Annual Computer Chess Tournament.

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Eight User Tests Give High Marks to OS/VS1

(Continued from Page 1)

sion users of his company's Multics system were likewise unaware of the system's virtual memory scheme. This often led to inefficient usage, especially for inexperienced users, he added.

The users see no need to plan since memory is "unlimited" and programs just balloon. Users initially pay little attention to file access methods or data organization since, again, files are "unlimited" in size, Hill said.

Diana Rode of IBM's Field Service Center reports on the field test of OS/VS1.

Eventually, however, algorithm design becomes more important than coding and experience with the "real world" of operational use returns the good programming practices, he added.

Users have to learn to cooperate since the Multics addressing scheme includes not only segment names but attributes as well. It is through these attributes that data can be shared by several users and kept exclusively for one, Hill said.

Multics, in use for some time at selected sites including MIT and Honeywell's own facilities in Waltham, Mass., is now available from the company as a special product, panel moderator John Brackett of Softech Inc. told the audience. There will be no major "announcement" of the product as some industry sources had expected, he indicated.

Users of IBM's CP/CMS are as unaware of their virtual memory as users of the other systems, but they go a step further: even the real 360/67 on which the control program is run is "transparent" to the user since he configures the entire virtual machine he wants.

Richard Bayles of National CSS told the session his company's implementation of CP on a dual 360/67 can support 275 simultaneous interactive users "and some batch work" with a swapping rate of 160 page/sec.

The system is effective enough, he noted, so that it is used for production work as well as the program development chores that the network founders had anticipated. In fact, 49% of the network facilities is currently being used for production, Bayles noted.

VM370 is a logical extension of CP/CMS. Using non-virtual-memory-oriented software will be possible, but it may perform more poorly than on a real memory system, according to Carl Young of IBM, Cambridge, Mass., where the system is being developed.

No complete description of the system is available, he said, but it is expected to have some functional enhancements for easier use.

TSS, the operating system IBM had intended for the 360/67, is being used at Ames Research Center, according to Wayne Hathaway of the National Aeronautics and Space Administration (Nasa).

Users fall into the same trap with TSS as with the other virtual systems, he noted, citing the example of a data acquisition program that took 1.7M bytes – disregarding the 1M-byte segment size that forms the basis of the system.

When challenged, Hathaway retorted, "Why not? I've got 16M bytes of virtual memory, don't I?"

Independents React

Continued from Page 1)

A spokesman predicted no major price changes, except the addition of an extended-term plan.

While prices of all the new enhancements have not been announced, the vendors indicated in many cases that IBM's pricing structures would determine final user costs.

The new Itel Virtual Lease Plan includes the IBM CPU, the dynamic allocation translator (DAT) box and Itel peripherals – monolithic memory, disk and tape drives.

The DAT gives a 155 a field upgrade to virtual memory, which Itel said makes it only marginally lower in performance than the 158.

Optimum configuration for the Itel plan would be a 155 with 1.5M bytes of memory, or a 165 with 2M bytes, an Itel official stated. When these systems increase in size beyond that level, a 158 or 168 could be cheaper.

Under Itel's eight-year lease plan a user could choose monolithic memory and peripherals from Itel, plus virtual storage on his present 155 or 165, at less than 50% of IBM prices, Itel said, adding this would give the user twice the price/performance of an IBM-rented 158 or 168.

Members Want to Know

What Are ACM's Goals?

By Edward J. Bride
Of the CW Staff

BOSTON – The members think major changes are needed in the Association for Computing Machinery (ACM), but a set of goals and priorities does not appear to be forthcoming.

Richard Canning, chairman of the Special Interest Group on Business Data Processing (SigBDP) and a member of the ACM Council, said last week that the council "missed a first step toward something useful" when the group failed to act on establishing formal goals.

"I think the council erred," he commented, adding "I was sorry then, and I'm still sorry now."

Canning was one of about 20 members to confront the ACM officers with personal and professional observations about the society, during the annual conference here.

President Anthony Ralston countered Canning's suggestions: setting goals "sounds good, but almost never results in anything useful."

Cause for the current dilemma appeared to be the failure last fall of a personal attempt by then-President Walter Carlson to have the council, ACM's governing body, set down a formal set of goals for the society.

Need for Priorities

Canning echoed Carlson's sentiments on the need for goals and priorities, since "that's the first step in allocating money." He also criticized what he termed the ACM history of starting projects, then watching the funds dwindle, but never cutting off the project.

Ralston agreed with that criticism.

Another member suggested the problem with setting priorities is that they tend to become the only tool for allocating a budget when, in fact, "there are important things to do, that cost little money to accomplish."

In response to the ACM financial situation, Chairman John Brennan of the St. Louis chapter urged the establishment of "junior" memberships, at half price, for inexperienced employees under the age of 26. Some members said the age differential would not be popular among most of the working class.

The executive committee is expected to study the Junior membership proposal as a way of encouraging young members to join. The membership proposal could serve as an alternative to local membership dues, members observed, since persons are permitted to join chapters without joining the national association.

Chapter dues normally run from $2 to $15.

Brennan noted that other societies refund to local chapters some of the money paid for national membership, but Ralston argued that local chapters in ACM are not sufficiently active to merit rebates.

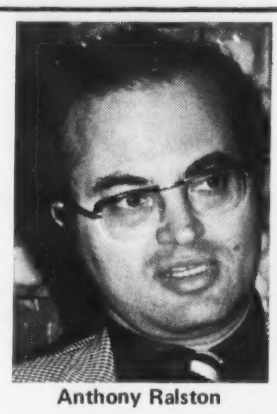
In the midst of the general criticism, Chairman Henry Grysh of the Detroit chapter stated a merger should be studied for example, with the IEEE Computer Society and/or DPMA.

While not new, the idea was applauded by some other members.

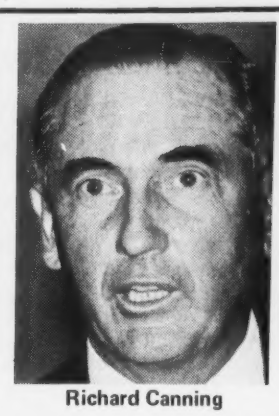
Grysh also criticized the late ACM mailings which made it difficult to help convince DP center managers to send people, he noted.

"I'll have a hard time justifying attendance at the next meeting," he said, criticizing the technical program itself.

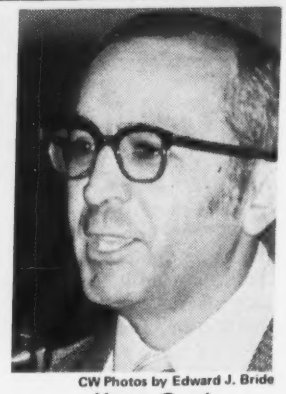
Grysh also questioned the representation of a panel which reported on a National Science Foundation project to establish a new curriculum for computer science study.



Anthony Ralston



Richard Canning



CW Photos by Edward J. Bride
Henry Grysh

The BDP group sponsored the panel discussion, yet three of the four members were from academia, he complained. ACM officials explained that all meetings during the annual conference had to be "sponsored" by one SIG or another, but this policy did not force the groups into any set format.

An attendee from The Netherlands noted businesses overseas are very interested in what is happening in colleges and universities.

A hand-count of the 100 attendees indicated about 80% found the program technically valuable.

Members spent almost half the meeting suggesting various ways to improve or cut costs in publications (one of the three chief ACM functions, the other two being the SIGs and the local chapters).

The most-often quoted problem with the ACM administration was the degrading of services caused by the financial crisis and, ACM said, by poorly designed subscription and membership renewal systems.

Anesthetic Reactions Studied

CLEVELAND – Major surgery patients may soon be linked to a computer to tell doctors how they are reacting to the anesthetic and how much of it can be tolerated.

As part of a complex three-year project by a team of doctors at University Hospitals and biochemical engineers from Case Western Reserve University, the computer is linked to sensors placed on the skin of the neck, arm and chest.

Information on heart functions is transmitted to the computer which prints out a calculation of cardiac strength, beat by beat. As before, the patient is given a test dose of the anesthetic agent, but this is now used to predict tolerance of the drug via the computer. The amount of risk is indicated by the speed and extent of any decrease in cardiac function.

Thus the doctors know if any anesthetic is one the patient should have or if the dosage must be modified. In either case it still is necessary for the patient to be monitored throughout surgery.

ACM Told of Need for Committee

Standard Synthetic Modules May Aid Measurement

By Don Leavitt
Of the CW Staff

BOSTON – A committee should be organized to look into the development of an industry-wide standard set of "synthetic program modules" that could be used for hardware selection, performance projection and performance monitoring, according to Prof. Henry C. Lucas of Stanford University.

Addressing an ACM session on Computer System Performance and Evaluation, Lucas said such programs should be able to measure hardware, software and their interaction.

'Kernel Programs'

These synthetic programs would fall somewhere between "kernel programs" and conventional benchmark runs, he said, explaining that kernels are artificial patterns of instructions designed to test particular system capabilities. Benchmarks are fully operational programs used to show that a given system can handle a known workload.

The modules Lucas proposed should let a user evaluate the combined performance of any hardware-software system, he said.

In addition, they would allow modeling of current or anticipated workloads and the testing of extreme cases which could not easily be created through testing of standard programs.

Some of the problems would include determining what modules ought to be in an industry-wide standard set, he noted, or in what language they should be coded.

How to Test

Questions also arise, he admitted, in trying to determine how to test unique features of a given machine that is by design non-standard. This is the problem current measurement tools have often had in working with Burroughs' Master Control Program (MCP), a member of the audience noted.

Even more troublesome might be the large number of runs and the correspondingly high computer time needed to utilize such a complete set of standard synthetic programs, Lucas said. But even conventional benchmarks aren't really good enough to test today's complex systems, he stressed.

Prof. Gary Carlson of Brigham Young University told the group that currently available hardware and software monitors are useful principally to document problem situations.

They provide hard-copy reports that often will prove the need or the "excess nature" of a channel, of tape drives or disk units – and that is important because managers can't afford to misjudge situations based on "gut feelings," he said.

To illustrate Carlson's point, Prof. Richard Madden of the University of Kansas described a situation that Weyerhauser Corp. had faced. Management had "urged" the DP department to cut its H-635 from a dual- to a single-processor configuration.

Graphs generated by monitor runs satisfied Weyerhauser management that each of the dual processors was already operating at up to 90% of capacity and that a cutback would be impractical, "to say the least," Madden said.

How Inclusive Are Personnel Surveys?

By Ronald A. Frank
Of the CW Staff

BOSTON – Current surveys dealing with personnel practices within the DP industry are necessarily biased because the persons sampled are usually members of professional societies.

This was one of the opinions voiced at the ACM meeting on the management of computer personnel.

Robert Dickman, session chairman and a staff member of the U.S. Department of Labor, agreed that surveys based on samplings within the membership of Afips, ACM and other societies may overlook the "non-professional working members" of the industry. But the societies are still the only representative source for sampling DP personnel attitudes, he said.

The DP societies are resisting the formation of business-oriented organizations within the industry, according to one of the session's attendees, and Dickman said he agreed with this action.

'Intellectual Ding-a-Lings'

"People who join professional DP organizations and go to meetings are intellectual ding-a-lings," according to Dr. Malcolm Gotterer, professor of computer science at Penn State University.

Gotterer described an unpublished study which sampled the personnel practices of the *Fortune* 1,000 largest firms within the U.S. About 370 responses to mail questionnaires were received from the vice-president for industrial relations within these corporations, Gotterer said.

Of the 8,000 programmers employed by the responding companies 21% of those classified as senior programmers have had "no post high school training," Gotterer said.

Union Members

One trend uncovered by the study showed an increase in the number of union members among junior programmers. While this unionization is now largely dependent on the type of industry in which the programmer is working, "much greater emphasis" will be placed on urging such employees to become union members, Gotterer predicted.

Within the financial, insurance, transportation and utility industries, programmers are usually classified as exempt personnel. This means they are not entitled to overtime pay regardless of the hours they work, Gotterer said.

3% Union Members

And in these industries unions are making their greatest inroads, he said. About 3% of the programmers covered by the survey are already members of unions, Gotterer said.

In a discussion on the professional status of a programmer, Gotterer said it "is hard to defend that provision."

While many students have considerable study within computer science curriculums before becoming programmers, some become proficient with a minimum of preparation, Gotterer said. Because of the discrepancy in their backgrounds, it is difficult to claim that a college degree is necessary, he said.

The salary of the average programmer is about $11,300, Gotterer said, so he is more concerned with earning a higher salary than attaining a level of professionalism, he said. In many cases professional status would only deny the programmer his overtime, he added.

The top pay for senior programmers averaged about $13,000, Gotterer said, but some higher salaries were found among senior programmers who work for DP manufacturers. The average pay for junior programmers, according to the survey is about $9,600, he said.

In the junior programmer category, 37% had no post high school training, but within the entire sample about 50% of the programmers were college graduates, Gotterer stated. The importance of a technical college degree may be overemphasized, Dickman said. He cited a 1971 survey by Afips which showed that DP personnel who are graduates in the "soft" or social sciences are paid about the same as engineering graduates.

This advertisement is for the prudent IBM 370 computer user:

TELEX® brings you "virtual storage" at no additional cost.

IBM announced

The virtual storage concept for System 370 is among the most significant in the history of our industry.

Jack S. James TELEX Computer Products President says—

"Now that the IBM virtual storage announcement has been made, you, the customer, should have no further concern for obsolescence of your System 370 during this decade. In reality, IBM has now freed you to finalize your total system lease with TELEX."

TELEX can save you a major portion of your System 370 equipment expenses by providing you superior equipment at greatly reduced monthly rentals under one of the following programs.

1. TELEX Total System Lease

Now you can save up to 65% of your 370 equipment cost by leasing the entire system . . . including the IBM CPU, TELEX tape, disk and printer subsystems and TELEX memories . . . from TELEX. Also we will guarantee you an upgrade to "virtual storage" at *no additional cost.* In fact, we can start your savings today . . . no need to wait for IBM's delivery of a "bundled" 158 or 168.

Here's the ideal 370 lease plan . . . one that provides maximum savings and maximum flexibility:

- Savings of up to 65%.
- No charge for extra shift usage.
- Maintenance from the manufacturer/ supplier.
- Guaranteed CPU memory upgrade and additional features.
- "Virtual storage" capability at no additional cost.
- Upgrade of TELEX peripherals.
- Lease terms from three to eight years, with early termination privileges.
- Exchange of purchased System 360 for a System 370.

Compare the savings for yourself.

TELEX TOTAL SYSTEM LEASE – 5-YEAR TERM VS. IBM BEST RENTAL PRICE (INCLUDING THE NEW IBM 370/158, 168)

IBM SYSTEM TYPE	TELEX SYSTEM TYPE	IBM* RENTAL	352 HRS. OVERTIME	TOTAL IBM MONTHLY RENT	TOTAL** TELEX MONTHLY RENT	TELEX MONTHLY SAVINGS	TELEX ANNUAL SAVINGS	% SAVINGS
370-135 3135 GF with 8-3420-5 tapes, 6-3330 disk and 2-1403N1 printers and appropriate controllers or adapters	**370-135** 3135 GF with 8-6420-5 tapes, 6-6316 disks, 2-5403 printers and appropriate controllers	$ 20,551	1,686	$ 22,237	$ 16,369	**$ 5,868**	**$ 70,416**	**26%**
370-145 3145 I with 8-3420-5 tapes, 8-3330 disks, 2-1403N1 printers and appropriate controllers or adapters and memory	**370-145** 3145 I with 256K Telex memory, 8-6420-5 tapes, 8-6316 disks, 2-5403 printers and appropriate controllers	34,334	4,318	38,652	26,846	**11,806**	**141,672**	**31%**
370-158 3158 J with 16-3420-5 tapes, 24-3330 disks, 2-1403N1 printers and appropriate controllers and adapters and memory	**370-155** 3155 J with Telex memory, 16-6420-5 tapes, 24-6316 disks, 2-5403 printers and appropriate controllers	64,942	7,270	72,212	50,492	**21,720**	**260,640**	**30%**
370-168 3168 K with 16-3420-5 tapes, 24-3330 disks, 2-1403N1 printers and appropriate controllers, adapters and memory	**370-165** 3165 K with Telex memory, 16-6420-5 tapes, 24-6316 disks, 2-5403 printers and appropriate controllers	108,682	16,018	124,700	92,278	**32,422**	**389,064**	**26%**

*Includes IBM's Fixed Term Rental Plan, Extended Term Plan, as well as the use of the newly-announced price modifications—Integrated Storage Control, Integrated File Adapter, the 3830-2, the 3333.
**Both the Telex and IBM prices include Virtual Storage and Dynamic Address Translation (DAT).

2. TELEX Short Term Rental of Peripherals

For those users desiring shorter term rental of TELEX compatible tape, disk and printer subsystems and memories, TELEX offers savings without impairing flexibility.

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Firm Exempt From Personal Property Tax

MINNEAPOLIS – The Minnesota Supreme Court has ruled that General Mills Inc. does not have to pay personal property taxes of more than $15,000 on a computer used for marketing purposes and other equipment used for quality control and research.

Although the 1971 state legislature abolished personal property taxes, the General Mills case goes back to 1968 when the state tax commissioner assessed the computer and equipment as personal property.

The firm contended that the computer was used for the "sale or distribution of marketable products" and so was legally exempt from taxation.

The tax official said the equipment was used for remotely related reports and statistics.

In its decision the court ruled that "for the uses indicated, the computer is an integral part of [General Mills] sale and distribution process."

News Wrapup

Amtrak to Go Nationwide

WASHINGTON, D.C. – Amtrak plans a nationwide computerized reservations service which will begin operations in the Northeast next summer. It is expected to be completely functioning by 1975.

The $7 million service will use a dual computer system from Control Data Corp. Reservations for the intercity rail service will be made by calling a toll-free number that will connect with one of four regional centers, Amtrak said.

The computers will be able to handle 18,000 reservations a day, with expanded capacity available when needed, Amtrak said.

Jail Population Cut

PATERSON, N.J. – A computerized jail list, part of the Passaic County Courthouse computer system, has reduced the county jail population by 20% and cut the wait for grand jury action in half.

The lists – which include such information as the inmate's name, whether he is awaiting a probable cause hearing, grand jury action, arraignment, or trial, whether he is serving a sentence and other pertinent facts – are given weekly to the county prosecutor. Cases needing expeditious action because of any time lag are then determined.

"When the system was first started, it took an average of 40 days for an individual in jail to have his case processed before the grand jury. Now . . . the average time is 20 days from incarceration to grand jury action," according to Superior Court Judge John F. Crane.

He also stated the new system has reduced the population of the jail from 380 to 400 persons to 300 to 325 persons per day.

Firefighting 'Fired Up'

TORONTO – A computer is now being used to fight forest fires in Ontario.

The Ontario government recently started its On-line Fire Index system to provide information and forecasts on fire danger in the province.

The computer, part of the Computer Sciences Canada network, is being accessed by the Forest Protection Section of the Department of Lands and Forests.

Information on humidity, weather and wind is sent to the Forest Protection Section in Toronto. This information is processed by the computer and the amount of fire danger in any one region is sent back to 52 stations in the province.

The computer also reads that day's weather forecast and predicts the following day's fire danger in any one area.

ACM Panelists Discuss Current Research

New Technologies Will Be the Way to Easier Software

By Don Leavitt
Of the CW Staff

BOSTON – Software will become easier to write and use during the next 10 years through the application of newly developing technologies and methodologies, not through new compilers or similarly "new" implementations of old techniques.

Panelists at ACM '72's session on current research in computer science agreed that the end user had to have an easier interface with the vastly improved hardware available. But they described a wide array of approaches to the problem.

– That man may be the problem as well as the solution became quickly evident. For example, both Prof. Edward Fredkin of MIT's Project MAC and Prof. Thomas Cheatham, head of Harvard's Center for Research and Computing Technology, used the same phrase – "Automatic Programming" – to describe their installations' current projects, but the projects are totally different in concept.

Project MAC is working on new ways for individuals, including non-DP-oriented business managers, to interact with their systems. Automatic Programming, in this instance, is an attempt to generate and then refine the user's programs through a natural language interactive exchange between man and machine, without any coding in the conventional sense.

Fredkin's staff is working toward a set of "protosystems," each oriented toward a given user application, such as inventory control. These would allow the CPU to "know" something about the user's needs even before the program development process starts, the professor said.

System Restraints

At Harvard, Cheatham's group is working on automating the application of system restraints, including file structuring and restructuring, so that users can concentrate on program logic. Programming in this environment would still require "reasonably precise" specifications and coding in conventional form, Cheatham said.

Through use of "extensible languages," however, the coding could be expressed in user-familiar terms rather than as DP functions. And the systems would include a repertoire of transformation routines that would automatically change data sets and algorithms to optimize the user's operation.

Harvard's prime concern is that these transformations, triggered by an internal evaluation of one part of the user's needs, must do no "violence" to the rest of the application or system. It will be a year or so before his staff will be able to do useful transformations, Cheatham said.

Dr. Herbert Shorr, director of IBM's Computer Science Department, reiterated the other panelists' concern for making systems easier to use.

He said IBM is quite aware of the need for easier man-machine interfaces, so that it employs behavior psychologists in hopes of avoiding any repetitions of the "JCL sorts of problems."

Support Distributed Bases

Techniques are being developed to support distributed data bases – and this probably is a good thing – Shorr said. It means, for example, that those responsible for particular files will be able to have them located locally, but users will be unaware of the dispersed nature of the total data base.

Dr. John Weil, vice-president and head of Honeywell's Advanced Systems organization, told the panel his company was concerned because technical capabilities built into the hardware are so far ahead of user capabilities. He felt that system designers had to become far more aware of mass storage and its implications for their work.

New file access methods of a non-mechanical nature should be and are being explored, he said, as are new techniques for recording data. In the latter area, research is progressing in laser memory, optical holography and electron beams as recording devices, Weil added.

Honeywell is also studying the use and significance of true archival files, which would be protected against either deliberate or unintentional destruction by use of read-only security after the initial writing of the file.

The company is concerned about the social responsibility of the DP user, Weil added. More than physical security, this involves questions of who has the right to create files and to decide what data should be included, and who has the right to access the data once it is recorded.

Right now, Honeywell has more questions than answers in that area, he admitted.

Dr. Larry Roberts, director of Information Processing Services for the Advanced Research Projects Administration (Arpa), reminded the audience that local production of software at user sites did not allow the same degree of accumulation of technology that the hardware developers gain from their organizations.

Data communications and processing networks such as Arpa may be able to ease that situation, he said, since they would allow users to access the particular type of processor they feel most appropriate to their needs.

Session chairman Prof. John J. Donovan of MIT summarized the current research picture by noting that the developers have clearly become concerned with "big payoff areas" rather than esoteric fine points in computer science. Research is concerned with the number of people that can be affected and by the positive way in which that impact will be felt, he concluded.

Magazine Mailing Moves

PORT WASHINGTON, N.Y. – An optical page reader is helping subscribers get their magazine orders filled more promptly.

Publishers Clearing House (PCH), a major magazine subscription company, is using an IBM 1288 optical page reader to shorten the time between the placing of an order and the delivery of the first issue.

Using a different stamp for each magazine he wants, the subscriber pastes the stamps on the order card and sends it back to PCH. The order card also contains the subscriber's computer-printed name and address.

The 1288 scans and coded stamps for the name of the magazine and the number of issues desired, and feeds the information along with name and address data, into an IBM 360/65 for processing.

Editorial

The Public Interface

We watched the Wizard of Avis turn inscrutable last week, flustering the Avis clerk, delaying customers – and generally damaging the reputation of computers.

The Wizard is a sophisticated system. Computers and communications lines are connected to terminals in such a way that a system failure will not disable all the terminals in the same airport.

But the systems people fell down on a key point. The clerks can't tell when the Wizard is sick. As a result, they keep trying to make the terminal work instead of filling out the forms by hand or referring the customer to another terminal.

It strikes us as a public relations disaster for computers when a system causes a clerk to take longer to serve a customer than it took under the original manual system.

Membership, Finances Suffer

Merging Societies Is Hazardous

By Stanley Rogers
Special to Computerworld

Dan M. Bowers [CW, July 5] advocates consolidating the computer societies and cites several valid theoretical reasons for doing so. Until about a year ago I was a strong advocate of his position.

Becoming deeply involved in serious merger discussions between Simulation Councils (SCI) and one or another of the larger computer societies forced me in my position with SCI to face some practical questions and consequently to alter my position, at least with regard to the merger of small societies with big ones.

When one finds himself in a real-life merger talk, he discovers some unexpected problems. One of them is that a majority of the members of the societies must agree to the merger – but experience has taught me it is hard to get a majority of the members to vote on anything.

Another problem is that a small society's dues are apt to be lower than those of a large society, so that the smaller society's members will be voting to raise their dues if they vote for merger.

True, they will receive more services and fringe benefits from the merged organization, but these will benefit the members unequally. Chief beneficiaries are the members who already belong to both organizations. Some members of the smaller society won't feel the added benefits are worth the higher dues.

Viewpoint

A deeper problem is that the smaller society's constitutents will lose identity after merger because the minority's interests become just one of many interests of the merged organization.

This is true even if they become a special-interest group within the merged organization. In the councils of the merged organization they would be just one of many such groups.

Furthermore, as time passes, the organizational milieu and financial patterns are bound to change, and the small society's "members" are not numerous enough to channel the changes along the lines of their interests and so to preserve their identity.

Publications Affected

Even more critical is the effect of such a merger on the small society's publications. Typically, the small technical societies serve highly specialized fields, and their publications have been developed to serve a specialized readership. People often join primarily to receive the publications.

Merger almost necessarily means accepting the publication policies of the large society, even though they may be incompatible with those of the small society. The large society, for example, may have a policy of "subsidizing" its various publications in proportion to its estimate of their worth to its members.

A small society merging with such a society would have little "clout" in decisions on distributing the funds available for subsidy and hence could not assure its members of the longevity and future technical coverage of its publications.

In a small society, practically any member can become active on a technical committee that interests him. This is much more difficult in the large societies. Merger may be seen as reducing the opportunities for individual participation and also as increasing the difficulty of getting one's papers accepted for publication.

Finances Affected

The most surprising consequence of entering into merger discussions – to me, at any rate – was the impact on the membership and finances of the small society. The fact that the members know that merger negotiations are under way appears to be unsettling because the future of the society and its publications becomes uncertain.

Dues payments slow, terminations of membership increase, volunteers feel their efforts may come to naught and therefore reduce their work efforts, and even purely technical activities lag.

At the same time the extra studies and analyses needed for the merger talks greatly increase the demands on the officers' and the paid staff's time.

There is a substantial dollar outlay in preparing and distributing the merger material, raising operating costs at a time when income is down. As a result, there is some danger that merger talks may force the small society to choose between dissolution and merger on any terms.

Thus, there are numerous philosophical reasons (coordination of activities, general efficiency, financial stability, fringe benefits, prestige) to favor the merging of technical societies with related interests, but there are also many reasons to stop and weigh the problems and the hazards before beginning merger talks. They could turn out to be a one-way road.

Rogers is secretary of Simulation Councils, Inc. in La Jolla, Calif.

Letters to the Editor

'Learson Extending IBM's Monopoly'

IBM's current growth within the domestic U.S. market has been one of 6% per year in its rental marketplace. To compensate for this very poor performance, IBM has aggressively oriented its salesmen to sell outright obsolete computer systems in the 370 computer system market.

To qualify for the IBM standard of minimum performance, which is the IBM "100% club," IBM salesmen today must meet their outright sales quota.

IBM's recent statement of 22% increase in profits over its comparable performance for the 1971 quarter and half year proves that IBM is using the outright sale of obsolete computers, with investment tax credit benefits, to obtain its requirements for monopolizing and exceeding the growth of the next four largest companies above it on the Fortune 500 industry chart.

IBM's announcement of its 370 Models 158 and 168 appears to be supported by the Justice Department. [The systems] will eliminate most of the OEMs in the peripheral marketplace and other companies' ability to support IBM maintenance and features on the central processing unit of such systems.

Vincent Learson should be congratulated on his new position as the head of the IBM Corp. in perpetuating this monopoly in spite of the IBM current antitrust suit with the Federal Government.

Thomas E. Doyle
George S. McLaughlin Assoc., Inc
Summit, N.J.

Chess Book Written

To answer the letter from Peter J. Huyek [CW, Aug. 9], I can recommend a book, *Computers, Chess and Long-Range Planning* by Mikhail Botvinnik, which, in its introductory chapters, discusses machine vs. machine and man vs. machine chess.

The book goes on to discuss an algorithm for playing chess on a computer which places a value not only on the pieces themselves but on their relative position at any point in the game.

Jerome P. Gonnella
Cincinnati, Ohio

And There Is Fischer

In reply to Peter Huyek's letter I should like to point out the very obvious reply: whether a chess player using a computer can consistently beat another player depends on how good the players are!

If they are better than the computer then the answer is no, and if the computer is better than the players, the answer is yes.

To date, no program can consistently beat a class "A" player. An "A" player is approximately 4 to 5 sigmas away from Bobby Fischer on the internationally used Elo rating scale.

William B. Adams
Hyattsville, Md.

Schools Offer Service

I enjoyed The Taylor Report on "Few Realize Wasted Resources of Local DP Schools" [CW, Aug. 2] and his invitation to computer schools to assist the data processing profession. We would like to accept the invitation and offer our services if needed.

We operate schools in the metropolitan Washington, D.C., area and in Los Angeles. We read with interest Taylor's frequent articles concerning DP schools, and I would like to commend him on the objectivity and fairness of his reporting.

We are proud of our schools and the contributions of our graduates to the DP industry. Surely any joint undertaking by private schools and groups within the industry should enhance mutual understanding and appreciation.

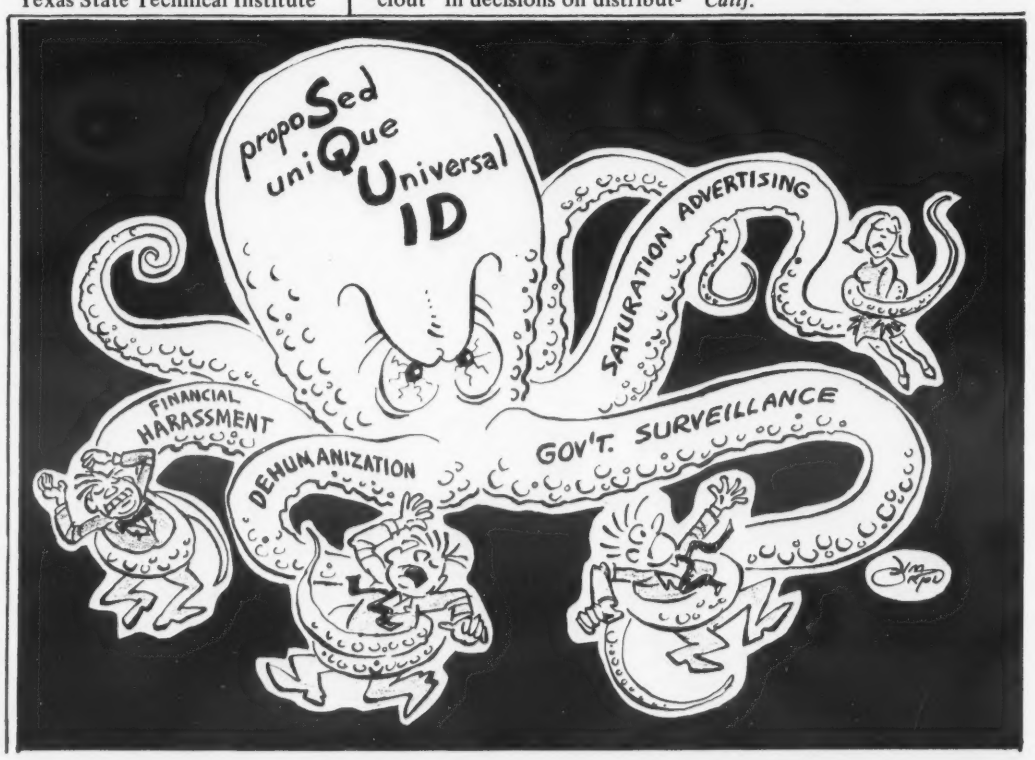
Bill G. Clutter
Vice-President
Computer Learning Centers
Rockville, Md.

Texas Sends Help

The computer science technology department at Texas State Technical Institute would be happy to consider assisting Alan Taylor with his Cobol project or others.

We regret that we were unable to enter the Furr Challenge Cup this year.

Ron Carswell
Program Chairman
Computer Science Technology
Texas State Technical Institute



PLC Needs Help—Cobol User Support Fund Launched

Xerox, IBM, Honeywell, U.S. Steel and the U.S. Air Force can afford to send representatives all the way across the country to attend meetings of the Conference on Data Systems Languages (Codasyl). But running a Xerox copier a few minutes longer to supply extra copies of Codasyl documents apparently is beyond the means of these companies.

The Taylor Report
By
Alan Taylor, CDP

This ridiculous situation was revealed in a letter from the Programming Language Committee Chairman Ron Ham to the Society of Certified Data Processors early this month. The SCDP had previously been told that financial problems prevented the committee from making its minutes and other public documents freely available.

The SCDP had therefore allocated some money to set up a chain of Cobol reference centers across the country, and keep them open for public reference and study.

Foreigners Get Many Copies

The SCDP confidently expected – after talking to committee officers – that enough of the mimeographed minutes would be available so that eight centers could receive copies and that three short-term loan plans could be made available for short-term postal loans.

After all, the minutes indicated the total requirements of 11 copies was less than what was being provided for the European Computer Manufactuers Association, or for the Japanese Cobol people – or even for the use of the Codasyl Planning Committee.

PLC Supports SCDP Aims

Unfortunately, the financial situation of these organizations must be even worse than seems possible. Ham said that only one copy can be available. He told the SCDP however, that PLC fully supports the society's aims of making the public information about Cobol generally available.

The result is that the SCDP apparently had to choose between two unwelcome alternatives. It could drop the idea altogether, and so disappoint the people who volunteered to act as "centers" and help in other ways, or it could restrict the number of centers to one, based on the one copy that PLC would supply.

Neither alternative was welcomed by Oscar Watts, the SCDP Cobol Coordination Committee chairman. He did not like dropping the idea, because he believes the public needs more information about Cobol. And he did not like restricting the number of centers to one, and abandoning the loan program, because, he said, it would effectively result in the formation of an SCDP "in-group."

And Cobol, he thought, already had more than enough "in" groups.

SCDP Cash Not Available

At the same time, Treasurer Brent Chapel calculated that for the SCDP to Xerox the appropriate copies from the precious single copy would cost a minimum of $2,000. The SCDP budget does not yet have this money. So it simply could not take on the job.

Watts' solution, which has been adopted, was to ask the Cobol community to help. After all, he argued, it will be helping itself. So he has started a Cobol Support Fund, especially to provide financing for the grass-roots users with access to Cobol information – through the Cobol repositories and in other ways.

He is asking individuals and organizations using Cobol to contribute. The SCDP will provide the administration, and help in every way it can, but the fund will be separately administered.

If there is enough money remaining after the centers have been made operational, then the contributors will be asked how they want the excess spent.

Watts thinks Cobol users need to know a lot more about what is happening within the Programming Language Committee. He pointed out that bit handling – an area that makes installations keep assembly programming skills not otherwise used – is logjammed. The power of the committee to drop Cobol features without notice, such as the report writer, should be closely watched, he stressed.

Whether a programmer, or a company president, a software expert or the treasurer of a professional society chapter, you, the reader, have been helped by Cobol over the past decade. Now you can repay that debt by contributing.

A form is provided below.

Cobol Support Fund

I/We enclose/pledge $_____for the Cobol Support Fund. It is understood that all contributions will be acknowledged.

We feel that the fund should pay particular attention to_____

Name _____

Organization _____

Address _____

(When completed please send to The Cobol Support Fund, c/o The Taylor Reports, Computerworld, 797 Washington St., Newton, Mass. 02160.)

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Form 208 This form approved by Commissioner of Corporations and Taxation

Is This Where We Learn Inaccuracies?

This tax bill was posted from the Framingham offices on Aug. 7. At that time the bill was already overdue by over a month. The bill was predated at that stage by over seven months! The procedure has been approved, so the form says, by the commissioner of corporations and taxations.

I wonder if the commissioner realizes he is saying that mere facts do not matter. The bill was not prepared on the date it purports to be – Jan. 1. Why then does he approve of sending an inaccurately dated bill?

Why I Don't Talk About Other Societies

One of the problems raised by The Taylor Reports is why the columns do not talk often about our other professional societies, although they often talk about the Society of Certified Data Processors.

The question is a reasonable one. The fact is that I do watch the activities of our other societies. And I'm not excited when press releases make up all the technical department material.

I watch society leaders proclaiming that their funds are nice and solid – and then suddenly discovering financial crises that they should have known about. (This allows them to change the rules of the game without membership's knowledge.)

And I watch societies with memberships in the tens of thousands – yet with only a few hundred "entitled to vote," thereby effectively insulating their government from their membership.

These are all news items of a sort, and in some ways I expect I should cover them. But I prefer to find more positive news.

The SCDP has been mentioned more than the other societies because it has done more than the other societies! The society that does the most for the grass roots is, in my judgment, the society that is worth mentioning most. I will be only too delighted when the other societies earn equal time.

Precious Metals Receive Precious Care

BLOOMFIELD, Conn. – The J.M. Ney Co., which refines alloys and fabricates precious metals, can account for every trace of precious metals in the plant, whether in the pure state or a minute part of a finished product.

From the time precious metals are received, the company can tell to the fraction of a pennyweight where they can be found, the result of detailed inventory control record-keeping by an NCR Century 100 computer.

The computer, besides identifying and totaling the individual alloys in stock, breaks out the special metal content of each item. For each alloy, then, management knows the quantity and dollar amount of every precious metal it contains.

With the computer maintaining a running tally, the firm can balance book inventories at almost any time.

Though some stocks are not balanced until the end of the month, the computer validates each transaction as it occurs so the records are accurate and timely to work with when updated. This enables the company to readily process month-end peak volumes.

At the same time, the computer generates the reports that permit management to detect variances between book and physical inventories and review standards.

The firm also manufactures precious metal contracts, assemblies and subassemblies for the electronics business. It therefore stocks a substantial value in gold, platinum, silver, palladium and a small amount of exotic metals in the plant at one time.

Weighed Daily

Of the total, one-fourth is weighed daily and balanced against computer-controlled figures. The remaining amount, mostly all other precious metals besides gold, are inventoried at least once a month.

When a metal is needed, a requisition is prepared. The metal is removed from the vault and weighed. A three-part transfer ticket is prepared, describing the metal and identifying the section receiving it.

One part remains with the department in charge of the vault. Another part goes with the metal. The third copy is sent to the accounting department for auditing and entry of the information into the computer.

Before the requisitioning section accepts the metal, however, the description is verified and the item is weighed.

At this point, the metal's movement comes under the control of the computer system and remains there until the product it becomes a part of is shipped and invoiced. A punched paper tape is created at invoicing and is entered into the computer to permanently remove the metal from inventory.

As metals move from the vault to one section and then to another in the manufacturing cycle, the transfer routine is repeated. Meanwhile, the computer's magnetic disks contain master files for each work section. Here inventories are maintained, reduced and added as the metal is transferred from one section to another.

The firm has master files for alloys in process, where the metal is melted into an alloy; materials in process, where alloys are further refined; work in process, where custom parts are made; and finished goods.

Besides controlling the movement of precious metals, the computer simultaneously applies production costs at each work station, drawing rates from an employee master file and calculating the time spent on the various jobs.

Colorado Park Backpackers Tracked

ESTES PARK, Colo. – In an effort to prevent overuse of remote back country, Rocky Mountain National Park officials are using a computer to provide information on the number and locations of backpackers within the park.

Campers planning to spend the night in the back country are required to obtain permits from rangers. Information needed for a permit includes the camper's destination, activities planned, such as fishing, hiking or rock climbing and date.

The data is keypunched and stored in a computer at the University of Colorado Computer Center. Park officials hope the computer analysis will provide them with more detailed information on population density in back country areas, from which trends in use can be seen.

Dave Butts, resource management specialists, anticipates that the system will aid in the distribution of park rangers. "Right now we're flying blind – playing the hunches in where we place our men," he said.

DP Training Personnel Meet to 'ACE' Their Problems

NEW YORK – Since unbundling, IBM's education courses have become too expensive for many companies. At the same time, few installations have had both money and talent enough to develop their own in-house DP training staffs.

But most users can benefit from a pooling of ideas in DP training, and that is the rationale behind the Association of Computer Educators (ACE), according to Gail Buerger, DP training director for Sperry & Hutchinson, and coordinator of ACE.

30 Companies Involved

Ace is an "informal, unsponsored, nondues-paying group" of DP training personnel in the New York metropolitan area. Open to anyone interested in attending its monthly sessions, ACE was started about a year ago and now includes about 30 companies, large and small.

The concept should be applicable to any metropolitan area with several DP sites, Buerger said. The local group draws from Connecticut, Westchester, Long Island and New Jersey as well as New York City itself. Each meeting is held in a different user site so members can compare notes on training methods and facilities.

Education

The group's purpose has changed from discussing problems of setting up an in-house training function to acting as a forum of new ideas and methods relevant to DP education.

PAT 'Illegal'?

One problem the group is trying to resolve centers on a warning from the Office of Economic Opportunity that various screening devices such as IBM's Programmer Aptitude Test (PAT) may be both "illogical" and "illegal."

OEO requires any screening test to be a fair sampling of the type of work an applicant might have to do if he passes the test.

One of the novel training aids ACE recently viewed is the "System 359" used by the Equitable Life Assurance Society of the United States, for entry-level programmers. The S/359 is a blackboard method of demonstrating instruction execution and data manipulation within a simulated computer.

Panel Discussions

Meetings planned for this fall are expected to include a panel discussion on methods of training systems analysts, and detailed plans for a course on communications theory for systems analysts and managers.

Two other planned meetings illustrate the spectrum ACE is trying to cover. One is entitled "Cost-Justifying and Selling Your EDP Training Program," the other, "Responsive Television – A New Technique for Multi-Media Courses."

Management should be concerned about any proposal that is going to cost money and have no apparent definable profit-producing product. Any proponent of a training operation better be well prepared with plausible anticipated savings and similar dollar figures, Buerger added.

Established training centers should also examine new "state of the art" techniques very carefully, she said. Multimedia approaches, coordinating audio cassettes, film strip projectors, books and terminal or CPU console operations, are becoming more popular now, but not necessarily any better, she warned.

The next ACE meeting is scheduled for Sept. 8.

Buerger's office at Sperry & Hutchinson is at 330 Madison Ave., 10017.

College Student Teaches Teachers

NASHVILLE, Tenn. – A college sophomore teaching a class of professors?

That unlikely event took place at Vanderbilt University when the School of Engineering found someone to instruct its non-DP-oriented mathematics teachers on programming. The school turned to Don Gilbert, a Goodlettsville, Tenn., student with special experiences in DP work.

Wrote Manual

Gilbert graduated from Goodlettsville High School near here three years ago. He spent the summer of 1969 at Vanderbilt helping to write a manual for an introductory DP course, even before he was formally enrolled as a freshmen at the college.

He polished the manual, worked at the university computation center and took a standard course load during his first year. The next summer he taught the professors.

During his sophomore year, he taught a course for upperclassmen in the use of computers and the problems of language development. As a class project, the students outlined a language based on a Fortran subset and designed to be a versatile training tool in various industries.

Camel Language

From the outline, Gilbert refined the specifications and created the Computer Assisted Mediated Education Language (Camel) and the manuals to make it useful. At the end of his junior year, he was developing a program in Camel, to teach Camel.

He has taught a DP introductory course for graduate students, school teachers and others attending summer school at the university.

Along with his own studies and his teaching duties, Gilbert has been working up to 20 hours a week in the operations section of Vanderbilt's computer center which supports 24 interactive and three remote batch terminals from a Xerox Sigma 7.

Loan Forms Stalled

WASHINGTON, D.C. – A change in the processing of applications for the higher education guaranteed loan program may cause problems for students and institutions, including DP schools, this fall.

As of July 1, the school must judge on a prospective student's need for the loan, and then complete a supplement form listing expenses that can be covered by the loan program.

The new form is still being designed. Until it is ready, banks are reluctant to process such loan applications, a spokesman for the Department of Health, Education and Welfare said, since the Office of Higher Education will not assume payment of the interest on loans approved by banks, without the school expense sheet.

The new form is expected to be ready before the fall term starts, HEW said.

Plastics Firm Finds 'Stopper' For Complex Ordering Process

By Ascher Chase
Special to Computerworld

NORFOLK, Va. – Accurate order processing is essential to a broad-based operation such as ours, involving 20,000 accounts which generate 40,000 orders annually, and a volume of shipments which places General Foam Plastics' (GFP) 400 products in 50,000 U.S. retail stores.

An IBM S/3 processes the daily office work and provides direct assistance to sales, accounting, shipping, production and management.

Five Conversions

GFP has gone through five conversions – from renting time on others' computers, trying a service bureau, obtaining its own computer (in 1969) and finally to the S/3. In the process, it has evolved a system uniquely its own.

At this point, we have six major computer applications: order entry, payroll, invoicing, accounts receivable, accounts payable and production reporting. The systems have been developed to interact with each other, under the overall concept of "performing the daily work."

This begins with production of a shipping document a shipping clerk can use in his work. From this basic step flow byproducts which are actually more important to running the business.

The 40,000 orders handled each year are made out on customers' forms designed to accommodate *their* needs.

Therefore, there is a difficult and complex order-editing step to determine factors such as pricing, freight allowances, freight routing instructions and whether the order should be accepted at all (customer credit check).

The answers flow from a "data base" of information stored on interchangeable magnetic disk packs. Housed in an item master file is data on up to 40 different price levels at which the 400 products may be sold, shipping weights and routing data and credit information.

When an order is received, a card is punched for it, and the information is fed into the computer. To begin with, the computer functions as an "error-stopper," "kicking out" any order for which information might be incomplete or items not properly numbered.

Checks Credit Level

The computer checks to see whether the new order will exceed the level of credit established for a customer, taking into account any back payments and the value of prior orders not yet shipped.

When all checks have been passed, a notice to ship is printed complete with packing slip showing the item's warehouse locations, bills of lading indicating a recommended carrier, a salesman's notification slip and copies for the firm's files. The order is completely priced, reflecting anticipated freight charges.

At this point, the order is also analyzed for profitability, showing gross profit with and without freight charges.

The system produces an approximate calculation of shipping charges. Later, when the freight bill comes in, it is compared to this calculation, and if there are sharp variances, it is referred to the traffic manager.

Byproducts of Notice to Ship

The credit checks, profitability analysis, precalculation of freight charges and printing of a recommended carrier are examples of the byproducts which stem from production of the basic notice to ship. Even as this work is processed, related files, such as payments still owed by a customer, are automatically updated.

The other applications draw on information developed during the order entry run, use similar master files and follow the same philosophy of careful error-checking at every step.

Production reporting shows items shipped and quantity, to assist in production planning and to chart consumer buying trends. Purchases by a customer for the year to date are compared to purchases over the same period the prior year, and include a breakdown of items purchased. Produced twice a month, this is sent to GFP's 300 sales representatives to use as a sales guide.

Computer-printed invoices, printed daily, provide each customer with complete data including the date payment is due.

Master List

A master list of all orders received on a particular day, listing customers, shipping points and payment due dates, reveals where products are being sold. A master list of products ordered, also produced daily, provides another fast sampling of what people are buying.

An edit master directory lists every customer, with the salesman servicing him, pricing levels, special packing instructions, credit data, invoicing locations and any other special information.

An edit freight directory helps route shipments from Norfolk to any city in the country.

A master credit list assists in a yearly analysis of credit ratings. Any revisions required during the year may be reflected immediately by changing the data base information. The master credit list permits an in-depth "look" at each account.

Also produced annually is a study of total business during the year with each customer, showing freight costs, amount still owed, credits issued for returned or damaged merchandise and the overall payment record calculated as an interest rate. This is a guideline to the amount of credit to be extended to a customer.

Installation of the S/3 constituted a big step – first, by permitting operating economies in running present applications; and second, because it set the stage for the future.

The operational language is RPG II. The staff consists of four women who are being cross-trained to develop programming and operating skills.

The system lets the firm use high-speed disk files as well as punched cards, depending on specific applications. The running time of some applications has been cut up to two thirds, and documents that required eight hours' time on prior equipment now take six minutes.

In comparative terms, the S/3 costs about 30% more than the prior system, but in addition to the advantages already gained, machine capacity has been increased by about 300%.

IBM systems engineers converted four of the six major applications, and handled a heavy percentage of the more difficult resystemization. No interruption in support of daily operations was necessary.

Chase is general manager for General Foam Plastics Corp. in Norfolk.

Transportation Systems Studied

WASHINGTON, D.C. – A task force has been formed to analyze information systems in the transportation industry, with the goal of eliminating or streamlining paperwork.

The Advanced Systems Concepts task force, formed by the Transportation Data Coordinating Committee (TDCC), will use case studies to construct methods for "intermodal interchange of data," for both machine and manual applications, said Edward A. Guilbert, president.

The group should have "working models" of transportation data exchange systems for demonstration next year, Guilbert said.

The task force is part of "Phase III" of a TDCC program for information systems linking shippers and carriers.

Introducing:

From the men than anyone else in

Solid. Webster's Unabridged contains a definition of the word that reads, "of good and substantial quality...". It is in this simple and straightforward sense that we have used the word "solid" to describe our new compatible processor storage for the System 370/155 and 165.

Solid source. We're one of the world's largest independent manufacturers of memories. Our customers include virtually all of the main frame computer manufacturers. We've supplied some of the largest and most reliable memory systems ever built—for commercial applications as well as for satisfying such stringent requirements as those of the Apollo programs.

Solid technology. We are deeply involved in both core memory and semiconductor technologies. This involvement gives us the objectivity and understanding to select the technology which best provides the user with the lowest price/performance ratio. And we have solid experience with our Caelus line of disc pack memories—for both Systems 360 and 370—installed in more than 2,000 data processing centers.

Solid design. Our new 370 memories utilize the most modern type of memory module—a complete all-on-one-card memory system made with our very smallest production core—18 mil. This design gives us superior reliability as well as a physical size advantage and permits us to deliver to the user a memory that is completely compatible with the unit it replaces.

Computer memories are our business. To us, it's a mighty big business. When we bring out a new product, we risk our entire reputation in this industry. And we don't do that lightly. That's why we sometimes take a little longer than some other companies who sub-contract their design and manufacture. That's why when we deliver our memories, we know they're the best. And that's what you will always get from Electronic Memories & Magnetics Corporation.

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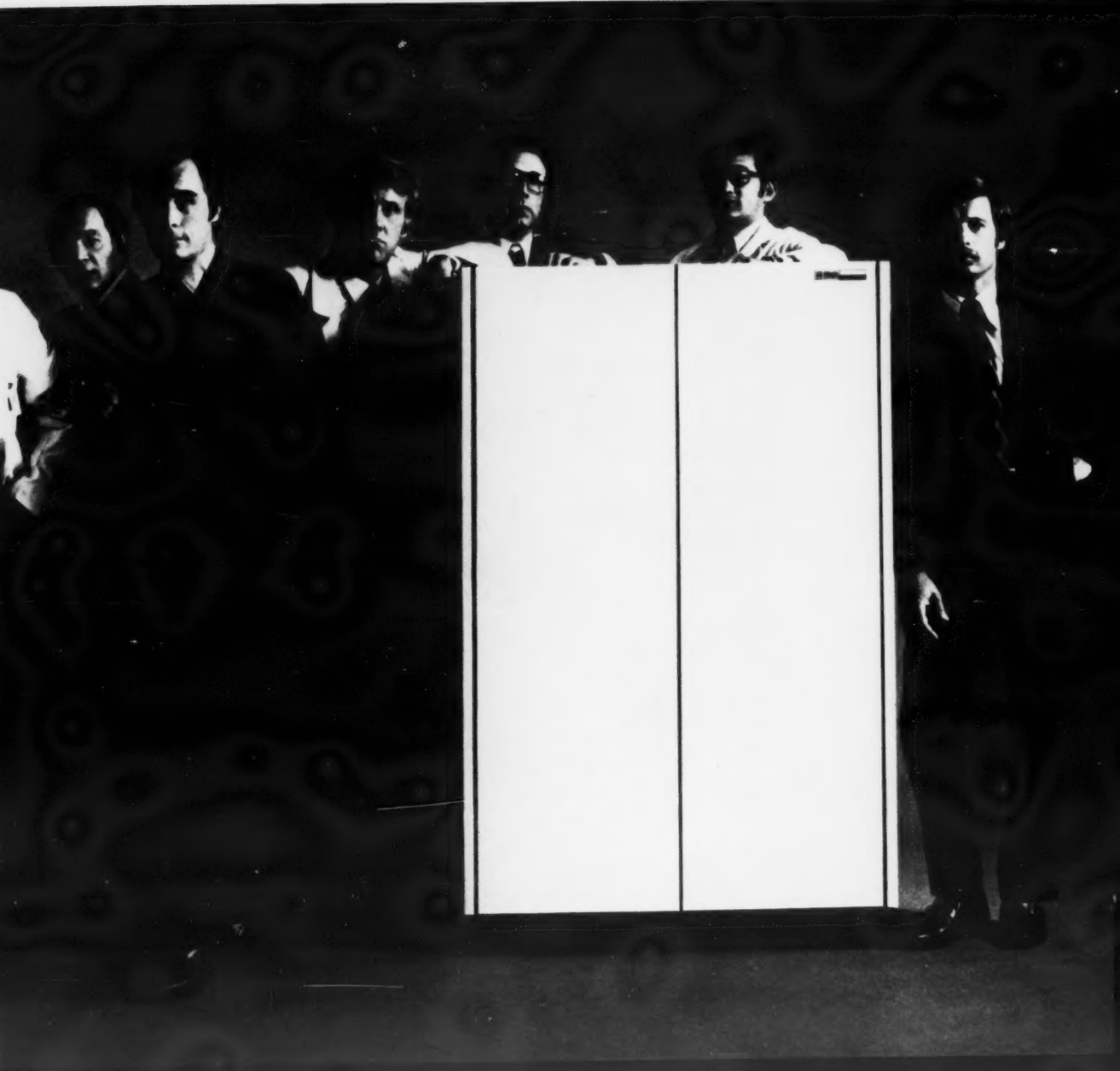
with more experience the memory business.



Micromemories 3650/155 and 165

Micromemories 3650/155 and 165 are compatible core memories for System 370/155 and 165 computers. The 3650/155 comes in three capacity sizes—262,144, 393,216 and 524,288 bytes—all completely compatible with and functionally equivalent to the IBM 3360, Models 1, 2 and 3 respectively. The 3650/165 comes in two capacity sizes—262,144 and 524,288 bytes—compatible with and functionally equivalent to Models 4 and 5 of the IBM 3360. All versions are based on the highly successful Micromemory 3650 product which is in mass production for several computer manufacturers. Physical dimensions of the 512K byte module are shown below. Modules originally installed as 256K byte units can be easily expanded to 512K bytes in the field.

TECHNICAL SPECIFICATIONS

Storage Element:	18-mil extended temperature range ferrite memory core
Memory System Type:	Coincident current (3 wire, 3D)
Cycle Time:	2.1 microseconds (3650/155) 2.0 microseconds (3650/165)
Interleaving:	None (3650/155) 4-way (3650/165)
Operating Temperature Range:	+59°F to +95°F
Operating Humidity Range:	Up to 95% RH excluding condensation
Power Input:	208/230 V ±10%, 47-64 Hz, 3-phase, 4 wire
Heat Dissipation:	4250 BTU per hour (256K bytes) 7750 BTU per hour (512K bytes)
Operating Altitude:	–1000 ft. to +10,000 ft. msl
Dimensions:	60.0" high, 38.3" wide, 31.6" deep for up to 512K bytes
Weight:	870 pounds

AVAILABLE MODELS

CPU Model 3155 (370/155)

Micromemory Models	Capacities
3650/155-1	262,144 bytes
3650/155-2	393,216 bytes
3650/155-3	524,288 bytes

CPU Model 3165 (370/165)

Micromemory Models	Capacities
3650/165-4	262,144 bytes
3650/165-5	524,288 bytes

Electronic Memories & Magnetics Corporation

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Random Notes

ISC Enhances 'Proforma' For T/S, In-House Users

BRAINTREE, Mass. – An enhanced version of Proforma, a "spread sheet" aid for financial analysis and reporting, is now available as a service on the Interactive Sciences Corp. (ISC) time-sharing network or as a package for installation on user's in-house equipment.

The enhancements support for IF-test logic and a series of report-editing features, including single or double underlining, parenthesis to indicate negative numbers and variable column spacing. ISC time-sharing is available in the Northeast U.S. The firm is at 60 Brooks Drive, 02164.

'Altlib' Scans User Library For Best Available Routine

ATHENS, Ga. – CDC 6000 users may ease the interface between their application programs and the installation's library of subroutines with the Alternate Library (Altlib) access package from Cosmic Information Services.

The package analyzes the user's program and selects all subroutines necessary, based on the analysis rather than on what the user may feel is the best routine. The 950-card, largely Fortran Altlib can be ordered for $250 from Cosmic, 112 Barrow Hall, University of Georgia, 30601.

'Cobol-eze' Eases Cobol Coding

SEATTLE – Cobol users have still another "shorthand" preprocessor to cut down the verbosity of the language, with the release of Cobol-eze by General Systems Corp. The package allows expansion of any name or phrase into fully acceptable Cobol source code.

Cobol-eze itself is written in Cobol and the package includes source code, DOS JCL and operating instructions for $102. Versions are available for non-IBM equipment as well as for 360s, the company said from 1255 Olympic National Life Bldg., 914 Second Ave., 98104.

Score III Adapted to H635/6000

PHILADELPHIA – The Score III report generator has been adapted to run on the Honeywell 635/6000 Series of CPUs, according to the developer, Atlantic Software Inc.

Score III supports calculations and the generation of output files as well as printed reports. The $15,000 package is available from Atlantic at the Atlantic Bldg., Fifth and Chestnut streets, 19106.

Calculator Works in Octal

ATLANTA, Ga. – The Octadat pocket-sized calculator from Radix Precision Co., (P.O. Box 13861, 30324) adds and subtracts in octal notation. The stylus-operated device sells for $15.94.

Results Good But...

'Severe' Problems Hamper CICS Users

By Don Leavitt
Of the CW Staff

NEW YORK – IBM 360 users with message-switching, inquiry, data-collection and similar teleprocessing applications have been able to use IBM's Customer Information Control System (CICS) with "reasonably effective results," but there can be severe problems, according to Computer Horizons Corp. (CHC), an independent consulting firm.

At a recent technical seminar it ran for CICS users, CHC noted terminal response time, ease of implementation and variety of functions performed by the CICS supervisor vary with usage from "satisfactory" to "excellent."

But both Version 1 and Version 2 of the OS implementation have deficiencies which require the frequent application of Program Temporary Fixes (PTFs) and Approved Program Analysis Request (Apar) solutions from IBM, CHC warned.

Basic Education Needed

A basic education in Assembler Language programming and CICS software is a definite prerequisite for successful implementation, the seminar leaders said, even though CICS supports ANS Cobol and PL/1 with both the DOS and OS systems. Use of CICS macros precludes the use of many high-level language features, CHC said.

Major revisions of present applications are recommended for efficiency, under CICS, since all I/O requests must be recoded, programs must be "quasi-reentrant" and entrance and exit linkages must be modified, the company said.

Constant User Attention

The volume and severity of CICS deficiencies require "constant" user attention to all Apar publications as well as PTF shipments. IBM support is available for both versions 1 and 2; however, there is usually a charge for system engineer service in connection with Version 1, he said. Field engineer service for Version 2 software problems is free.

Some problems reported under Apars, CHC said, are:

- File Control Program ABENDs, when attempting to browse a segmented file.
- CICS-supplied Terminal and File I/O Area definitions for Cobol will cause "E" level diagnostics in compiles.
- File Control Program generation without BDAM causes an incorrect logical record address to be placed in the symbolic FIOA address field at the end of an Isam read operation.

Core requirements may be a problem. Most installations using OS Version 2 have partitions exceeding 100K. "Complete and accurate" estimates, however, of core requirements are available in an IBM manual, the company noted.

A $25 booklet summarizing the seminar is available from CHC at 30 E. 42nd St., 10017.

$10 Quarterly Newsletter Lists Software Abstracts by Subject

WASHINGTON, D.C. – Users with the patience to wade through unevaluated and unformatted software abstracts on a given subject can get them, for $10/subject, from the National Computer Program Abstract Service (NCPAS). A newsletter listing the subjects is updated quarterly and costs $10/yr.

NCPAS hopes to become the nationwide clearinghouse for basic information about software from all sources. Developers wishing to add abstracts of their programs to the NCPAS listing may do so without charge.

NCPAS makes no effort to evaluate contributed abstracts, or to mandate how they are formatted. Any user seriously interested in a listed program should check it out with the developer or marketer, NCPAS said, and that source is identified in each abstract.

The service claims to have 3,000 abstracts summarized in its first newsletter, but does not attempt to separate them by language used or hardware required to make them operational.

The listing shows the programs in each subject, and the number of sources, so users can see how many abstracts they can get.

NCPAS is at P.O. Box 3783, 20007.

'QL/1' Handles IMS Inquiries

ROCKVILLE, Md. – Query Language One (QL/1) from Comress Inc. is designed for data bases controlled by IBM's Information Management System (IMS/360) on medium- to large-scale 360/370 systems.

Without a language such as QL/1, application programs for the IMS/360 data base must be written in Cobol, BAL or PL/1, the firm noted. But with the new support, reports can be formatted or data extracted through simple English language statements or queries.

Several report writing packages have been modified to work with IMS data bases, but QL/1 has the advantage, Comress said, of being developed under the same man who originally developed IMS.

In query mode, QL/1 permits additions, deletions or modifications of information within the IMS data base; listing of selected data fields; and the performance of statistical computations on specified fields.

The calculations can use an unlimited number of modifiers so that actions may be as restricted or open-ended as the user wishes, Comress said.

In report mode, the package provides the classic features of pagination, dating, three levels of heading (and one of footnotes), margin and tab settings, as well as variable spacing. Full relational and logical operators in comparison statements are also available.

QL/1 operates on any IBM 360/370 that supports IMS.

The package is available on a three-year lease arrangement for $9,600.

Comress is at Two Research Court.

Material Needs Planned by 'MRP'

BURLINGTON, Mass. – IBM 360/370 manufacturing users can now develop time series materials plans from a sales forecast or master production schedule, with the Material Requirements Planning (MRP) software of Manufacturing Management Sciences Inc. (MMS).

The system, custom-tailored to user needs, includes bill of materials maintenance and explosion and implosion functions. Gross-to-net time phasing, lot-sizing options and exception reporting are also part of MRP, as is a safety stock option.

MRP run time options permit gross, net and offset order calculations, and the net requirements calculation routine includes the ability to net against open orders as well as available inventory balances, MMS said.

The system is built around item master and product structure files. Balances may be present on the item master file or loaded from any input device at run time. Open order information, an optional input, may be loaded from any appropriate file, a spokesman said.

The system is designed to run on a 32K IBM 360 with three disk packs. It costs $15,000 for the DOS version, which includes 15 days of installation assistance, or $20,000 for the OS version, with 25 days of MMS help.

MMS is at 279 Cambridge St., 01803.

IBM introduces Virtual Storage for System/370.

A major part of your data processing investment is in the people who work with your computers. Virtual storage is designed to help them become more productive.

Virtual storage is designed to make System/370 more versatile, flexible and responsive. It can increase the productivity of programmers by freeing them from much time-consuming and routine work.

Yet for all its revolutionary implications, it is an *evolutionary* development, involving no major reprogramming of most applications.

Increasing the computer's efficiency

Virtual storage is simply a way of making more efficient use of a computer's main storage (also called "memory") in most applications.

Instead of holding an entire program in main storage throughout its execution, only those parts actually needed by the computer are brought in at any given time. The rest is kept on disk files, ready for immediate use.

Virtual storage thereby lifts many of the restrictions previously imposed by the physical size of main storage.

It gives an apparent main storage capability that is vastly greater than the computer's real storage—up to 16 million bytes. That is four times greater than the *real* main storage of IBM's largest computer.

More jobs, more functions

Virtual storage can greatly broaden the range of applications feasible for an IBM System/370.

It can permit more jobs to be run concur-

rently. Larger jobs. More on-line, remote terminal jobs. It can thereby potentially expand the capabilities of computer installations. Individual programs, however, may require more time for execution under virtual storage.

It has the potential to reduce the time and work required for developing, testing and maintaining new applications. It opens up exciting new prospects for program design.

It permits many jobs to be interchanged between large and small System/370 machines. To the extent that jobs can be interchanged, a smaller machine can now back up a larger machine.

Compatible growth

Virtual storage capability can be provided by a simple on-site engineering change in System/370 Models 135 and 145. At no charge.

If you own a System/370 Model 155 or 165, virtual storage capability will be available at additional cost. These enhanced computers will be known as the Model 155 II and the Model 165 II.

Four new operating systems support virtual storage on System/370. In addition, a major new access method, called VSAM, facilitates advanced on-line and data base applications.

In many cases, existing System/370 and System/360 programs can be run under virtual storage with little or no change.

Two new models in the System/370 line

IBM also announces two new System/370 models, both equipped with virtual storage capability and advanced all-monolithic technology. They are the Models 158 and 168. They provide the greatest computing power of all IBM's virtual storage models and continue the logical evolution to greater function and higher productivity for data processing installations.

An advance in productivity

As the needs for data processing become more numerous and complex, so do the demands on the computer. And particularly on its main storage capacity.

By more effectively using that capacity, virtual storage makes possible expanded computer use.

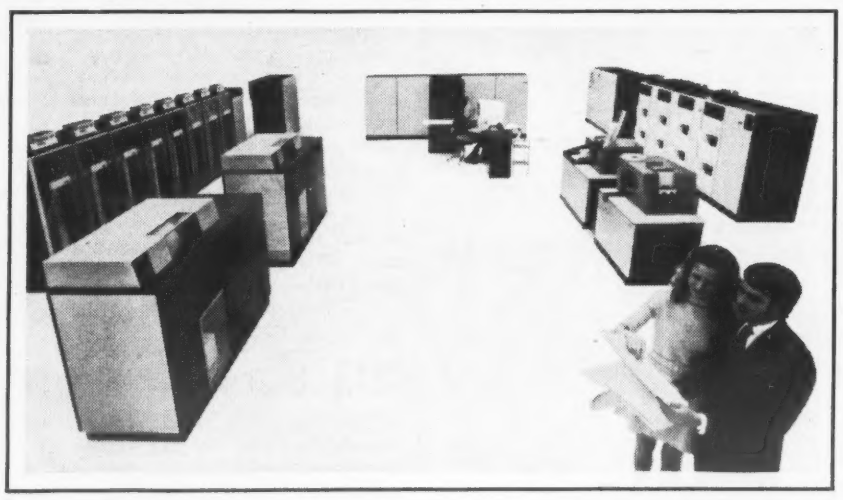
It allows more jobs to run concurrently.

It permits many applications to be developed more easily and rapidly.

Virtual storage. Another way IBM adds to the value of your data processing investment.

IBM.

The new IBM System/370 Model 158 features instructions designed to speed up the central processing unit, as well as an operator's console with a lightpen for systems control.



The new IBM System/370 Model 168 has a real storage capacity of up to four million bytes. It has the ability to handle 12 channels for high-speed devices.

Sigma Jackpot

Xerox Enhances Data Manager

EL SEGUNDO, Calif. – Increased data availability from an integrated data base, greater flexibility in data manipulation and improved file security are among the benefits to be gained by Sigma 6, 7 and 9 users, through the enhanced Data Management System (DMS) software from Xerox.

Designed to operate under the Universal Time-Sharing System (UTS) or the Xerox Operating System, DMS is said to conform closely to the recommendations of the Codasyl Data Base Task Group. It utilizes a free-form, natural Data Description Language and Cobol-standard naming conventions, Xerox noted.

The new DMS supports an area definition feature which allows a data base to be subdivided into as many as 64 segments, of which only the active areas need be on-line.

Paralleling that, a sub-schema generation feature permits a user to limit the data descriptions and I/O areas within his applicaiton programs to those data base entities to be accessed.

The system allows the use of indexed sequential data storage to simplify direct retrieval, but supports an extensive security system to protect the data base. Separate passwords are required to modify a schema or to generate a new sub-schema, as well as to use an existing sub-schema.

Read access and updating of specific data groups or items must likewise be authorized by passwords, the firm said.

Security can be extended to include enciphering and deciphering of data, with a user-selected bit pattern which is logically combined with data.

DMS includes input validation through Cobol-like picture clauses, procedural trace routines which may be invoked optionally to aid in the debugging of application programs.

Under the UTS implementation of DMS, scheduled for the second quarter of 1973, 64K words of memory are required. The Xerox Operating System version, planned for the third quarter of next year, will need at least 48K words. Peripheral storage, in either case, may be mixed fixed-head disk or disk packs.

DMS is free to educational users, while others will pay a monthly fee of $425, Xerox said.

Software House Adds RBM Aids

ANAHEIM, Calif. – Users of Xerox Sigma mainframes are beginning to get software support from independent vendors as well as from Xerox itself.

Code Research Corp. has announced four utility packages for the Sigma 5 or 7.

The Code packages operate under the Real-Time Batch Monitor (RBM) software system and include:

- Card reader and line printer symbiont processors.
- A remote batch processor with dual card reader and dual printer spooling capabilities.
- A Fortran source code edit processor.
- A run-time interactive debug package.

The symbiont or spooler allows slow speed I/O to be placed into intermediate high-speed storage for more effective interfacing with the speed of the CPU. The remote batch processor includes spoolers for the I/O devices at both the CPU and the remote site, a Code spokesman said.

The Source Edit Processor includes some syntax checking and allows updating through additions, deletions or modifications of single lines within a program. Its library includes images of all the changes made to a program so that users can work back to an earlier version in case of problems with current logic.

The run-time interactive debug package has been developed for use with CRT or teletypewriter terminals, but can be adapted to serve other peripherals, Code said. They support the setting and resetting of breakpoints, when selective "snapshot" core dumps would be made without further operator intervention.

The simple symbiont package costs $9,500; the remote batch processor with dual symbionts is $19,500. The Fortran source edit processor costs $5,000. The support for debugging CRT programs also costs $5,000 while the teletypewriter-based package is $3,500.

Code Research Corp. is at 2141 West La Palma Ave., 92801.

DOS Goes 'Anyplace'

PINOLE, Calif. – Marcus Powell Associates (MPA) has released version II of Anyplace, the $1,800 DOS/360 self-relocation processor. The package is said to support a self-relocating version of the ANS Cobol compiler, DOS Group 1, 2 and 3 utilities and user programs.

Single- and multiphase programs, even those which load non-executable overlays containing only DTFs or other tables, can be handled by Anyplace, MPA said.

Anyplace II, including source code and maintenance, may be purchased from MPA at 2694 Doidge Ave., 94564.

COMMUNICATIONS

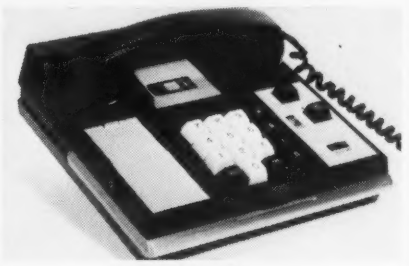
Data Briefs

Portable, 3-lb. Terminal Uses No Hard Copy for I/O

DALLAS – A portable remote terminal with an acoustic coupler has been introduced by Chancellor Industries, Inc. Smaller than a 2-in. stack of typewriter paper, the unit weights 3 lbs.

The Model 102 operates through a tone-to-digital converter for input, and in conjunction with audio-response units including IBM's 7770, for output, since there is no printer on the current model.

It operates on battery or AC power, and can be leased for $25/mo for three years, from 3005 LTV Tower, 75201.



Model 102

Equalization, Fast Turnaround Featured in New Rixon Data Set

SILVER SPRING, Md. – A 4,800 bit/sec data set, with automatic equalization and "fast turnaround time for polled applications," is available from Rixon Electronics.

The Model DS-4801 is designed for multipoint polled applications over type 3002 voice-grade facilities. Switch-selectable data rates of 4,800 or 2,400 bit/sec are synchronously transmitted in either half- or full-duplex modes, Rixon said.

Price has tentatively been set at "around $5,000" for purchase, or about $150/mo, Rixon said. Deliveries are expected around the end of the year, from 2120 Industrial Pkwy., 20904.

Automatic Rewind Set for TTY

SKOKIE, Ill. – An automatic rewind feature is now available for the Teletype 4210 magnetic tape data terminal, permitting users to place the terminal in an unattended answer mode and receive data at speeds up to 240 char./sec.

After receiving data, the 4210 automatically rewinds the magnetic tape at 400 char./sec, turns on the Teletype printer, and prints hard copy at speeds up to 150 word/min.

Available from stock, the feature costs $95, from 5555 Touhy Ave., 60078.

'Are Nets for Real?' IEEE Asks

PALO ALTO, Calif. – Users and designers of computing networks from "minis through maxis" have been invited to submit papers on the topic "Are they for real?" for a conference in San Francisco next winter.

The meeting, Feb. 27-March 1, at the Jack Tar Hotel, is the seventh annual conference of the IEEE Computer Society. Dubbed "Compcon," the conference will feature discussions on "all practical computing network systems."

Information is available from Robert Warr, 1020 Corporation Way, Suite 213, 94303.

Modem Has Spectrum Optimization

ROCKVILLE, Md. – Tel-Tech Corp. has introduced a new line of data modems featuring a data transmission technique which allows the operator to optimize the spectrum for each transmission line. Designated the "Thru-put" series, the modems are available with data rates from 1,800 to 9,600 bit/sec.

The firm is at 11810 Parklawn Drive, Rockville, Md., 20852.

In-House Testing -- Part II

Less Technical Approach Can Also Help

By Ronald A. Frank
Of the CW Staff

It is difficult for users to determine exactly when in-house testing should be initiated, according to John Kelly, director of engineering at Hekimian Laboratories Inc., Rockville, Md.

While the actual line costs may only add up to $5 or $10/hr, the actual loss of CPU and terminal operating time can be much more vital, Kelly believes.

As a rule of thumb, Kelly said users with dial-up lines for backup in case of problems with leased channels probably should consider acquiring some test equipment.

One user that has made maximum use of simpler in-house testing is Standard Oil of Indiana. The firm's "fault isolation" methods have been successful. On 4-wire systems, many Bell companies will provide users with a manual switch to "loop around" the line, according to Robert Bump, teleprocessing specialist. This makes it possible to isolate data sets for testing, he said.

Easy Interchange

When modems are installed, Bump requests they be connected via a plug/jack arrangement so they can be easily interchanged when trouble is suspected in one unit.

On continuously used leased lines, Bump asks the local phone company to install an amplifier and speaker connected to a monitor jack. When problems are suspected on the line, the user can listen to determine whether the carrier is present, Bump added.

One suggestion, according to Bump, which can lead to a solution is close cooperation with the operator who first reported the trouble. The user should have the operator attempt to duplicate the trouble conditions, and if not possible, a careful description of what happened can often provide a clue, he added.

While Bump's approaches may not be as technical as those of users who rely on test equipment to monitor their line, the results are what count. And Bump reported that the current rate of "trouble incidents" on the Standard Oil data channels is one failure every eight months. The average downtime per failure, he said is about four hours.

Another user with some unorthodox methods for trouble reporting is the Kiewit Center at Dartmouth College which operates the Dartmouth Time Sharing System.

Reporting System

In a booklet titled "How to Live with Ma Bell and Love It," Tom Byrne, assistant director, described a trouble reporting system which the center worked out with local New England Bell officials.

A detailed trouble reporting form provides as much information as possible about the type of line problem, when it occurred, where it was first detected, etc.

Dartmouth has worked closely with the phone company to perfect the reporting system and the local office even returns a copy of the trouble form to Kiewitt noting when the problem was fixed and service restored, Byrne stated.

The exact duration of a service outage can be important to users, Byrne said. Most state tariffs contain minimal outage times after which the user can claim credits on his phone bill. While he concedes that bill credits don't make up for service outages, it does help to soften the monetary impact of such conditions, he added.

Easy Interpretation

Rather than relying on the operation of test equipment by skilled personnel, some companies supply test sets that can be interpreted relatively easily.

The telecommunications Division of Data Products has a test unit that automatically carries out tests, analyzes the results and displays the findings for the operator. The device, called Detect, is installed at each end of a communications link. When a problem is discovered, operators at each end of a link establish contact by phone and each depresses the test button on the local unit.

"Users will become more knowledgeable in the use of test methods and equipment. They are beginning to realize the importance and limitations of their communications facilities where previously they were concerned primarily with computer-related problems," John Kelly feels.

"The user who calls his local phone company with detailed data describing the characteristics of his channel will usually get enthusiastic cooperation from technical representatives. If you can pinpoint the problem, that makes their job a little bit easier," he emphasized.

Savings Only Part of the Reason For Switch to Non-Bell Modems

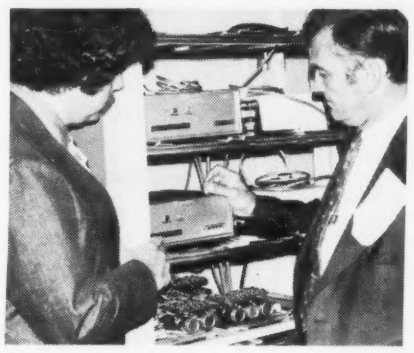
CHICAGO – With 230 modems in a data network transmitting messages to 1,000 CRT terminals, the cost and efficiency of the data sets become important.

United Air Lines first considered independent modems a few years ago – it was using a Bell 201B in its Unimatic communications system. Serving operational functions, the system handles traffic dealing with freight schedules, parts supplies, aircraft routing and flight information scheduling, according to John Richy, technical services manager.

The Unimatic system includes three interconnected Univac 1108s which handle queries from about 1,000 Uniscope CRTs around the country. The data network includes 30 multipoint lines, some of which connect to 11 different cities. For hard copies, the remote sites use 25 char./sec Univac page writers.

After careful evaluation of Bell and independent replacement modems, United installed 2,400 bit/sec units from Penril. "We were reluctant to go to non-Bell modems at first," Richy said. But it was hard to argue with the advantages and cost savings, he said.

United was paying $72/mo for its Bell 201B data sets. The Penril modems cost about $25/mo when amortized over a liberal five-year write-off period, Richy said. Even when the $47/mo savings per modem is offset by the 20 spare units which United keeps on hand, the savings is more than $9,800/mo.



Paul Lobel (left) of Penril checks modem operation with United's John Richy.

But the savings is only part of the story, Richy said. When a Bell modem needed attention, there was always a question of how soon a qualified repairman would arrive, he said. But with the Penril data sets spares can be connected whenever a malfunction is detected, he added.

The United system, which handles up to 60,000 messages in a peak hour, operates on voice-grade C2 conditioned lines. And despite the extra line cost Richy thinks conditioning offers the user some hidden advantages.

Conditioned lines get better "routing priority" within the Bell System, he said. This often means better quality lines running through more modern central offices, he stated. And when a line problem does occur, the more direct routing makes it easier for AT&T to check out his system, Richy believes.

In order to save on equipment costs, United developed a modem-sharing device, or MSD, Richy said. This unit enables one modem to control four CRTs. "They cost about $250 and a user can save that much in one month compared with Bell modem costs."

Richy likes the "simple helpful features" in the Penril modems that were absent in his more expensive Bell data sets – such as a line status indicator and loop-back capabilities that simplify fault isolation procedures.

United is now considering a modem upgrade from 2,400 bit/sec to 4,800 bit/sec. Is he convinced of the advantages of non-carrier equipment? "Anything we do from now on will be from independent suppliers," he answered.

Memorex Adds Buffered Terminal

SANTA CLARA, Calif. – Memorex has added a buffered multipoint terminal to its 1200 Series that offers greater capabilities at less cost than the IBM 2740.

The 1242 can operate in communications systems equipped with the IBM 270X line controller or the Memorex 1270 terminal control unit.

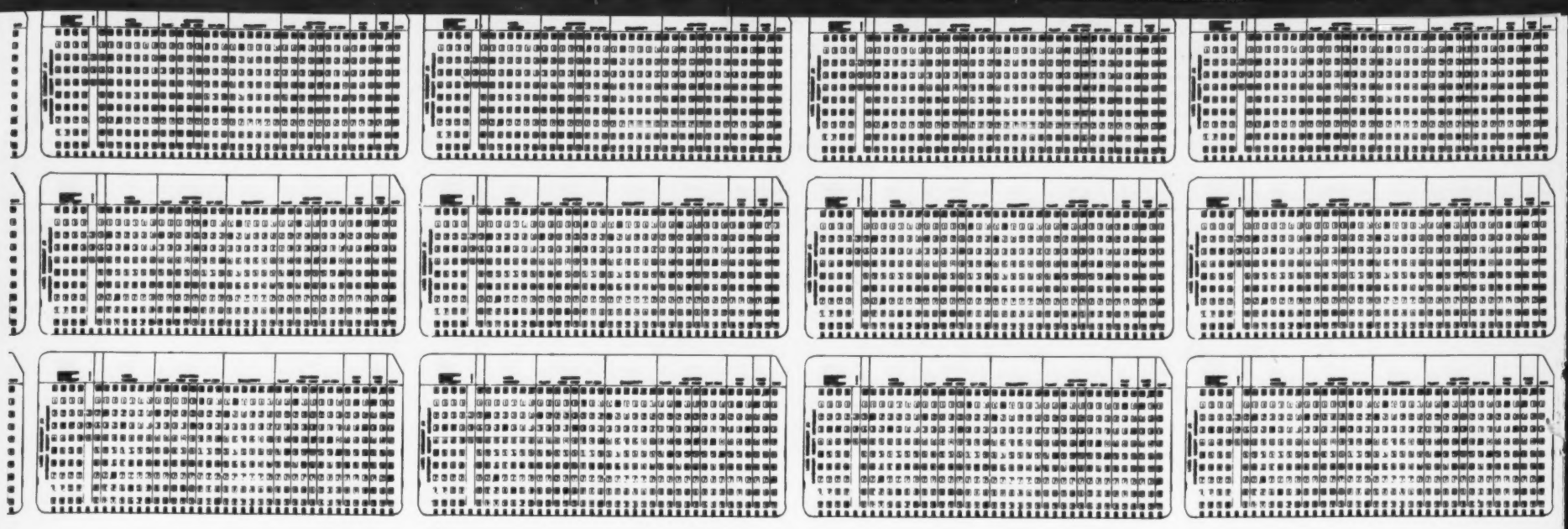
The terminal can print at 30 char./sec compared with 14 char./sec for the 2740. In addition, when used with the code convert II feature of the Memorex 1270, the 1242 can operate in either BCD or Ascii code format, a spokesman said.

When used in Ascii format, the 1242 appears to the IBM CPU as a conventional 2740 terminal, he added. The net effect to the user is that no change is required in the basic IBM 2740 Model 2 software, he said.

The 1242 operates with 2- or 4-wire private line systems and can handle transmissions at 1,200 bit/sec. The terminal has a basic 256-character buffer which can be expanded to 512 characters. A split buffer feature allows the operator to enter data more efficiently than in the 2740, Memorex said.

Key input from the 1242 can be printed, stored in the buffer, visually verified and transmitted to the host CPU. An optional feature allows the unit to print at 60 char./sec.

The basic 1242 with record-checking and edit features costs $195/mo. This is about $10 less than a 2740 Model 2, a Memorex spokesman said.



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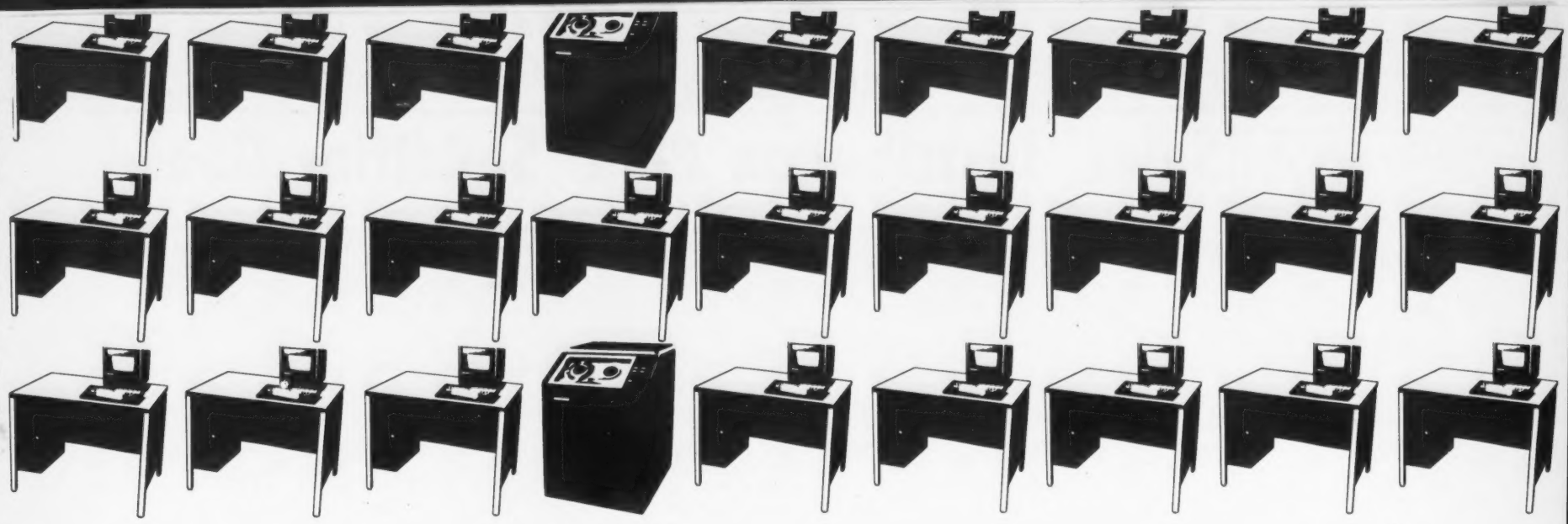

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INFOREX

Sales, Distribution Plan 'Solidifies Goals'

MARSHALLTOWN, Iowa – In 1913, when Lennox Industries Inc. was only manufacturing sheet metal furnaces for local sale, it began a program of marketing expansion that laid the groundwork for the system that now includes factories and warehouses across the U.S.

The present Sales/Distribution System (S/DS) is a completely computerized operation that involves the company's entire domestic and commercial air conditioning and heating.

According to Dick Spencer, manager of financial control, the need for such a communications system was recognized by management about three years ago. The magnetic tape transmitters then in use were numbers-only and read-only, which limited the flexibility of the S/DS.

Data processing hardware and staffs were duplicated at divisional locations and there was a time lag in getting the information to headquarters. The limitations of the read-only magnet tape sets were further complicated by the lack of page copy at the transmission point, so operators were not aware of errors. Some reports had to be compiled on request; automatic reports didn't always get back to the field.

The new system consists of 42 outlying terminals in the U.S. – in sales offices, warehouses and divisional offices. The terminals are Teletype Model 33s, with an alphabet/number keyboard used with its own Teletype 4210 magnetic tape data terminal for high-speed transmission. The four division offices of Lennox also have a Model 37, with a 4210 unit.

The system uses an IBM 360/50 at the central DP center. An IBM 2701 data adapter utilizes a Bell System 202 data set.

When a dealer calls in an order and a shipment is made, the information is handed to the operator who enters it from the 33 keyboard into the 4210 terminal, and at the same time gets page copy from the 33 for checking and future reference.

As many as 250 shipments, each with 150 or more characters, are entered on the tape throughout the day.

The last thing the operator does at night is put the unit in an automatic send mode. From this point, until the following morning when the operator begins storing the new day's data, the terminals are unattended and automatic.

At midnight, the computer at the corporate DP center begins calling each terminal and receives the stored information from the mag tape units at 1,200 word/min on-line.

Simultaneously, the computer is preparing invoices, updating inventory reports and preparing other data reports. After all stations have been polled, the computer makes a second call to each terminal, this time sending an error analysis – transmission errors, operator errors, processing errors.

In the morning the operator of each station reviews the error report and begins to store the day's data. The whole process takes about two hours.

Since the Wats line used for transmission had already been installed, the only additional cost was for terminals.

Inventories Reduced

Considerable savings more than offset these costs. Finished good inventories have been reduced by as much as 30%. The clerical effort required at division locations to prepare invoices and shipment papers has been eliminated. Better control of accounts receivable is expected to shorten cash flow time.

The Model 37s located at four of the division offices are also used to provide the various management reports. Such reports are transmitted at high speeds, via the associated 4210, for field use.

"The system has great flexibility," Eldon Bartsch, Lennox project manager for management information and planning, said. "We could design a new form and set of instructions and have a whole new set of information fed into the computer.

"But we aren't likely to need it since we now have transaction-based data being stored in its original form. We can therefore pull summarizations or answer report requests without disturbing the system.

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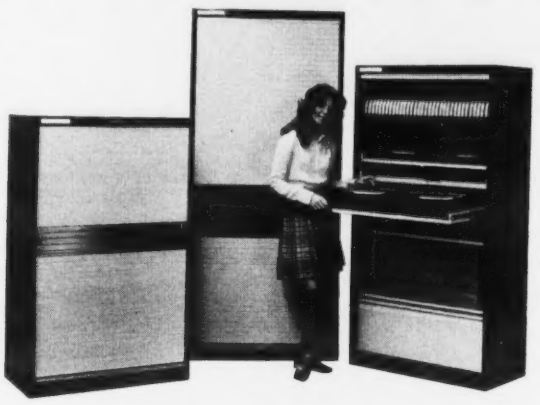

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Wright LINE

MEDIA MANAGEMENT SYSTEMS

Bits & Pieces

Tape Libraries Automated By Xytex Unit on 360/370

BOULDER, Colo. – An automatic tape library, the ATL-1, from Xytex Corp. fully automates tape retrieval, mounting, dismounting and storage, under Xytex software and operating system of IBM 360 or 370 computer, Xytex said.

No modification of the user's programs is necessary, the company added. Storage capacity of the ATL-1 ranges from 831 reels to 7,061 reels (more details in CW, May 24).

Prices start at $85,000, or $1,840/mo, from 3850 Frontier Ave.

System Industries Has Interface For Microdata-Diablo Devices

SUNNYVALE, Calif. – An interface between Microdata byte-oriented minicomputers and Diablo Systems dual disk drives has been introduced by System Industries.

The device uses the System Industries 3010 Disk Controller, plus power supply and interface hardware, and has a storage capacity of 2.5M words, the vendor said. Through the interface, the Micro 800 and 1600 series join small systems made by DEC, Data General and Varian as potential users of the Diablo drives.

The interface, available for both end-users and OEMs, is priced at $12,500 from 535 Del Rey Ave., 94086.

Trucker's Turnkey System Shown

SAN FRANCISCO – An on-line load settlement system for bottlers, bakers and fluid milk producers has been introduced by Computer Firmware Systems, Inc. (CFS).

Based on the Westinghouse 2500 minicomputer, the turnkey system could also satisfy the needs of the trucking and warehousing industry, through revisions, the company said.

The system provides a daily audit of sales invoices and load settlements, then correlates invoice quantities and dollar amounts to the truck counts on an individual product basis.

Systems are preprogrammed to user requirements, with maintenance provided by Westinghouse to reduce the need for professional computer staffs, according to CFS, at 260 California St., 94111.

P-350 Mag Card Storage Doubled

NEW YORK – Storage capacity on the magnetic ledger cards of the Philips Business System P-350 Series of small computers has been doubled.

A new reader head doubles the density of information on the magnetic stripes on the cards, the company said. The new head provides up to 672-digit storage on the P-354 and P-358 models, and up to 1,344 digits for the P-359, which uses double-striped cards.

Site Planning Problems Highlighted

By a CW Staff Writer

Floor space, electric power and security considerations are the top problems facing users involved in site planning, according to a *Computerworld* sampling of professional planners.

The most obvious problem, and universally applicable, is probably space allocation, but it is the easiest to solve, respondents indicated.

The worst that can happen in the future, one user said, is that computer systems will offer considerably higher power in about the same size enclosure. Others contacted seemed to favor increased computing power of future systems housed in smaller spaces.

Space plans, however, should not neglect what user Alan Rothmayer at the Bankers Trust Co., New York, called "turnaround space," i.e. sufficient room to allow parallel operation when new computers are being installed.

Another easily neglected area pointed out by Rothmayer is storage space, especially since some areas like tape libraries can be expected to expand.

Power Needs

Electrical power requirements can be expected to go up with the increased computing power in future systems, according to Gordon T. Christensen of the Architectural Services Division of Control Data Corp.

The division functions as an independent group in that it will contract to do site planning and installation for any computer.

John R. Bucsi of Univac's customer engineering, which provides Univac users with site planning assistance on a bundled basis, sees power requirements rising because of an increasing number of peripherals attached to a system.

The increased power requiremements that might be expected to follow increased computer power will be offset by new technologies, he believes.

The need for an uninterrupted source of electrical power will become more important in the future, the respondents stated.

They all felt the installation of uninterrupted power sources will be more common in computer installations, especially in the more sensitive (on-line) sites.

Currently in the process of designing a new site, Rothmayer has included a system for handling power failure. His equipment will be supplied through a battery-based power source that allows an orderly shutdown in case of power failure while providing a "smoothing" effect on power line fluctuations.

The three agreed on a trend away from the showcase atmosphere that typified early computer installations and toward "seeing a computer as a functional piece of equipment that gets a job done," in Busci's words.

The trend away from the show window approach coincides with an increased awareness of security requirements. Future site location and building construction will emphasize the preservation of the owner's investment, Christensen added.

Single, Full-Width Track

First Data General Cassette Made for Nova

By Edward J. Bride
Of the CW Staff

SOUTHBORO, Mass. – A new cassette drive emphasizing electronics rather than electromechanical operations is the first Data General cassette for its Nova line of minicomputers.

The unit records data on a single, full-width track, which Data General claimed would minimize errors from debris, tape wear and skew.

All servo controls and all but one clutch-and-pulley system have been eliminated on the Nova Cassette. A ratio technique of recording allows accurate reading and writing, regardless of tape speed, the company added.

The reel drive motor runs at constant speed, the company said, adding that the recording density of the tape varies in proportion to the radius of the pulling reel.

A read-after-write head configuration allows immediate verification of recorded data, a feature which the company claimed is usually available only on full-sized tape drives.

Character transfer rate of the Nova Cassette is 1.6 kbyte/sec with average storage capacity of 100K 8-bit bytes, at 650 bit/in.

The drives are modular, in that a single chassis can house up to three drives; a single unit could be purchased initially, with one or two drives added later.

The power supply and drive electronics are all on a single circuit board, mounted in the drive chassis.

Control Software

Software for the new drives will include "all the procedures normally associated with paper tape," the company said, including assembling, editing, debugging and program storage and retrieval. An operating system and cassette handler subroutines will be included.

To take full advantage of the free software, a user will need at least a 2-drive unit, which costs $2,750. Also required is a controller for $1,500, which can handle up to eight drives.

A single-drive unit costs $2,000, and a 3-drive unit costs $3,500. Besides the interface control unit and drives, the minimum configuration includes the Nova CPU with 8K of 16-bit main memory and a teletypewriter with paper tape facility, Data General said.

Deliveries are expected within 60 days, from Rte. 9, 01772.

Telex Hails VS, Gives Upgrade

TULSA, Okla. – Just as the waves of IBM's new hardware announcements appeared to be calming, Telex stirred things up again with a cost-free "virtual storage" upgrade to its "total system lease" customers.

IBM promised free upgrades to Virtual Storage for users of the 370/135 and 145, and now Telex has done the same.

In making the announcement, Jack S. James, president of Telex Computer Products, said: "Now that the IBM virtual storage announcement has been made, the customer should have no further concern" for obsolescence of the 370 during this decade.

"In reality," he continued, "IBM has now freed the customer to finalize his total system lease." The Telex lease plan includes an IBM CPU and Telex peripherals, [CW, June 28].

The basic Telex plan offers savings of 15% to 23%, with no charge for extra-shift usage. Maintenance is done by Telex, which guarantees the CPU memory upgrade with additional features, plus "virtual storage" capability at no additional cost, the company related.

All Telex peripherals are upgradable, and the lease terms are from three to eight years, James said, with early termination privileges.

370 Model	IBM rent/mo**	Telex rent/mo*	% saved
135*	$20,551	$16,369	20
145*	34,334	26,846	23
158	64,942	50,492	22
168	108,682	92,278	15

***Including such "typical" peripherals as five tape and six disk drives, two printers and appropriate controllers. Larger configurations include more peripherals.**

****Overtime must be added to IBM prices, but not to Telex, so savings indicated are minimum savings.**

IBM's most favorable pricing formulae are used, including fixed-term rental plan or extended-term plan, where appropriate. New price modifications and features also included: ISC, IFA, 3830/2s and 3333.

EMM Memory Box

EMM Replaces 155, 165 Memory

LOS ANGELES – Electronic Memories & Magnetics Corp. has made available IBM 370/155 and 165 add-on and replacement central processor storage products.

Called the Micromemory 3650, the EMM units for the 370/155 come in three capacities: 256K, 384K and 512K bytes.

These units are functionally equivalent to and compatible with the IBM 3360, Models 1, 2 and 3. Memory for the 360/165 comes in two capacities: 256K and 512K bytes. These units are functionally equivalent to and compatible with IBM 3360 Models 4 and 5.

The products are based on the Micromemory 3650 which has been in mass production for several computer manufacturers for more than a year. The module is designed for optimum reliability when operated at 650 μsec cycle time. Cycle time for the System 370/155 is 2.07 μsec and for the System 370/165 it is 2 μsec.

Micromemory modules originally installed as 256K byte units can be expanded to 512K bytes at the customer's site. EMM said prices on purchased 512K memories were $171,500 or 26% less than IBM equivalents. Lease prices were 19% lower on one-year leases.

First deliveries are slated for the fourth quarter of 1972 from 1880 Century Park East, 90067.

Mag Tape Ability Extended to Century 50

DAYTON, Ohio – NCR Century 50 computer users can now use magnetic tape for input and output with the release of 7- and 9-channel tape-handling units and controllers.

Available for use with the Century 50 are the 7-channel 633-117 tape unit with transfer rates of 10, 28 or 40kbyte, and the 40kbyte 9-channel 633-119 unit. Also released are two tape controller units – the 624-119, to monitor 9-channel handlers, and the 624-179, which will handle either 7- or 9-channel tape units.

Each controller monitors up to eight tape handlers.

Either of the tape handlers can be rented for $350/mo or purchased for $17,000.

The controller for 9-channel tape handlers rents for $300/mo or sells for $14,000, while the dual-ability unit rents for $350/mo or sells for $16,500. All the units are available on a 90-day delivery basis.

Recognition Equipment Sets Up Usage Pricing Plan

DALLAS – Recognition Equipment has extended to its Output Image computer output microfilmers new usage pricing programs that reduce the cost of using these products by approximately 50%, according to the firm. The plans were effective Aug. 1.

Usage pricing plans on the COM systems are offered on both per-frame and hours-used bases on contracts of 24 months or longer. The plans enable a customer to install equipment with the right to operate it for a specified number of hours – or to process a specified number of frames per month.

Printer Copies CRT Output

MIDDLESEX, England – A $3,000 electrostatic printer from SE Computer Peripherals makes up to 10 hard copies of information displayed on a CRT.

The unit, which has a maximum speed of 700 char./sec and makes a single copy in three seconds, can be equipped with a memory to facilitate multiple copies, the company said. As the first copy is generated from the terminal, the data is stored in the memory to produce successive copies.

CI Notes

Genesis One to Market Core

NEW YORK – Genesis One, marketing arm of Management Assistance Inc. (MAI), has entered the add-on core memory market, with an agreement to handle Corpak 360 memories manufactured by Information Control Corp.

Corpak units are compatible with 360 models 22, 30, 40 and 50.

DPSA Plans I/O Seminar

STAMFORD, Conn. – The Data Processing Supplies Association (DPSA) is finalizing plans for its "Input/Output Systems Seminar 72," which will be held in New York City, Oct. 3-5, at the Sheraton Hotel. The theme will be new applications and new technologies, with emphasis on supplier devices, according to President Vincent A. Tauber.

Supershorts

SYS Computer Corp. is engaged in talks with Hazeltine Corp. which may result in substantial modification or cancellation of its previously announced $600,000 contract for microprocessors.

– – –

The General Services Administration has awarded Federal Supply Schedule contracts to Pansophic Systems, Inc.'s Panvalet library system and to Edutronics Systems International, Inc.

– – –

National Cash Register is planning to construct a $4 million worldwide distribution center for computer and other business machine parts in Peachtree City, Ga.

– – –

Programming Methods (PMI) Division of GTE Information Systems has assigned JMA Systems Corp. of Tokyo exclusive rights to market its Score File Management System in Japan.

– – –

Shipments of Pitney Bowes-Alpex, Inc.'s Sales-Point-Information-Computing-Equipment (Spice) systems exceeded $1 million during July.

– – –

Versatec, Inc. has appointed Rikei Corp. to sell and service its line of Matrix electrostatic printers, plotters, combination printer/plotter units, computer controllers and software in Japan.

– – –

Itel Corp. has completed a $5 million multi-currency credit line for its Itel International subsidiary through an agreement with the First National City Bank.

– – –

Apeco Corp. has acquired Cascade Data, Inc. for $4 million in stock. The market for the firms' copiers and minicomputers is essentially the same – the small business user – Apeco said.

John Postley

John Cullinane

Specializing May Avoid Software Obsolescence

By Edward J. Bride
Of the CW Staff

BOSTON – Software houses concerned with the obsolescence of their products because of possible mainframe changes are relatively safe if they design packages for IBM, Burroughs, NCR or Honeywell computers, according to John Cullinane.

The president of Cullinane Corp. said specialization within these four lines, particularly with IBM's System/3, is probably safe from manufacturer obsolescence. He made his remarks while on a panel comprised of four DP presidents during the annual conference of the Association for Computing Machinery here.

John Postley, president of Informatics, agreed that IBM's "self-compatible line of hardware" is the main reason his company's market is with IBM and IBM-compatible equipment.

John Bennett, president of Applied Data Research (ADR) stressed "what concerns us most is IBM's free software." There is probably no ADR product without some form of competition from independent software companies, but this is good for the industry and for product development, he said.

IBM Like Elephant

Cullinane commented that IBM is "like an elephant. They can turn around and step on you, without really meaning it." The possibility of free or underpriced software from the industry giant remains a threat to the software industry, he indicated.

The Cullinane Corp. might branch away from the single business of software products, he said, into some form of general support functions, but he would not elaborate since proprietary software will remain his chief business for the next three years.

The only non-developer on the panel was Allen Jorgenson, president of Computeria, which markets products for the DEC PDP-10. He envisions markets in problem-solving and data-base applications, particularly through time-sharing.

The panel was part of the commercial program which was held in lieu of exhibits.

On the possibility of program plagiarism, the President's Panel suggested that proprietary products are vulnerable. Bennett said the best safeguard may be a signed contract with each user, spelling out exactly what would be done with a program.

While ADR has one software patent, it has not been tested in the Supreme Court yet. The constitutionality of software patents could be overruled, he acknowledged, adding he believes some of these patents should be allowed.

Postley agreed on this point, as did Cullinane, who also suggested it takes a "conspiracy" to steal a program, and even then it would take a tremendous marketing effort to compete with some of the products discussed during the panel.

DP Industry Must Unify To Limit IBM Markets

By S.P. Eglash
Special to Computerworld

Our industry today is far more complex than that which existed in 1956 when the IBM consent decree was signed. At that time the industry consisted of primarily integrated mainframe manufacturers. They supplied their own peripherals, their own software and their own lease capital.

Today we are better described as representing three points of a triangle, IBM, other computer manufacturers, and peripheral manufacturers/leasing companies, where action against one can adversely affect the other two.

The dilemma is how to encourage continuing developments in computing within our free enterprise system without adversely affecting the various parties involved.

Some time ago I met with representatives of the Justice Department. It was clear they were intent upon either breaking up IBM or controlling it as a pseudo-public utility.

It should be remembered that the breakup of the original Standard Oil empire into its various components did little to ensure the competitive health of the petroleum industry.

A computer industry suddenly besieged by several "minibehemoths" would create a competitive industry only in statistics. Yet forming a utility similar to AT&T would do nothing to improve the competitive posture of others within the industry.

Those of you who have looked for a pay phone in Manhattan know what can happen to service when a company operates a utility.

Change Status Quo

It is clear, however, that the status quo cannot remain. Under IBM President Vincent Learson, aggressiveness has been unremitting. Higher lease-purchase ratios of the 370 have effectively destroyed the future of the leasing companies.

One can always make judgments about equipment life cycles and, while IBM succeeded in convincing a court in Phoenix of the rationale of its pricing policy, few in the industry consider that policy any more than an effective means of eliminating a competitor.

The 370 family, including the 158 and 168, go even further. The increased amount of memory built into the CPU will further cripple the future of the add-on memory companies.

Peripheral suppliers are constantly faced with new disk

Viewpoint

products on which specifics become known only upon first deliveries. This continuing pressure throttles their development and delivery capability.

Many of these products are available only on the 370 family, speeding obsolescence of the leasing companies' huge portfolio of 360 purchased equipment.

IBM's announcement included increased CPU prices and reduced memory prices. It was further recognition that it is facing more significant competition from IBM-compatible devices than from competitive mainframe manufacturers.

Today the new Computer Industry Association and the peripheral companies are attempting, by legislative or legal means, to have IBM announce peripheral specifications at the time of product announcement rather than at the time of delivery.

This would give these companies an opportunity to develop compatible products and deliver them shortly after IBM makes its first deliveries. It sounds reasonable, but the effect on the other computer manufacturers could be disastrous. It is difficult enough for Honeywell, NCR, Univac and the others to price their products 10% to 15% under IBM.

But an IBM versus non-IBM buying decision today includes an evaluation of non-IBM peripherals, non-IBM memory and financing by a third party. Under this barrage, any price advantage of a mainframe competitor vanishes.

All Should Share

What is needed is a solution that will permit all segments of the industry, including IBM, to thrive, to be rewarded for their

(Continued on Page 31)

CDS-110 Has 64 Tracks

Century Expands Floppy Disk Line

ANAHEIM, Calif. – Century Data Systems Inc. has unveiled a new "floppy disk" drive, the CDS-110, that has twice as many tracks as the CDS-100, and sells for $500 in OEM quantities, compared to the $750 for the CDS-100.

The CDS-110 stores over 1.4M bits on 64 tracks. The data transfer rate is 33.3 kbit/sec and track-to-track access time is 40 msec. Units are available with read only, read/write or read-after-write capability.

The unit is designed for applications currently using paper tape, card and cassette devices, and will be available in September from 1270 N. Kraemer Blvd., Anaheim, Calif., 92806.

Xebec Moves Disk Formatter

SUNNYVALE, Calif. – Xebec Systems Inc. has introduced a new moving head disk formatter that it said will interface any modern minicomputer to a fixed platter, moving head disk subsystem.

The XDF-50 Moving Head Disk Formatter utilizes MSI circuits to provide all data conversions and control logic functions. This includes the control of up to four single- or dual-disk drives at spindle speeds of 1,500 or 2,400 rpm, parallel-to-serial and serial-to-parallel data conversion, multiple disk addressing, seek overlap, and data protection circuits.

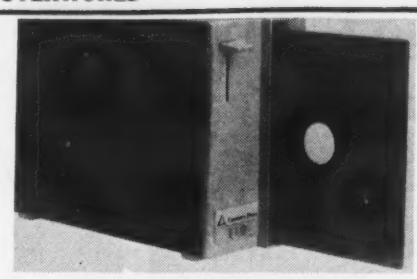
The XDF-50 costs $2,200 in OEM quantities from 566 San Xavier Ave., Sunnyvale, Calif., 94086.

Other New OEM Products

The 5800 series of data conversion systems from Analogic Corp., Wakefield, Mass., designed to link scientific and industrial instruments with minicomputers, contains a universal motherboard that can accept up to 64 single-ended or 32 differential channels with up to 15 bits of differential. The $1,100 model includes 16 channel multiplexer, 8-bit AD converter, power supply and timing logic.

– – –

The M Series line of solid-state logic and interface modules from Dynage Inc., Bloomfield, Conn., is designed for hard-wired industrial control applications. The logic is slowed to 1,000 Hz through discrete capacitors, offering "extreme" noise immunity, permitting the designer to mix I/O modules with logic modules in the same card rack, the company said.



Century Data Systems CDS 110

– – –

The new Stand Alone Series # SA core memory from Standard Memories, Inc., Ft. Lauderdale, Fla., is a single PC board assembly with 3D, 3-wire coincident current memory. Storage capacity is 4K or 8K words, with word length of 18, 16, 14, 12, nine or eight bits. Cycle time is 650 nsec and access time is 275 nsec.

Analogic Series AN5800 Converter

– – –

The Model MP69632 Alterable ROM from Datapac, Inc., Costa Mesa, Calif., is designed specifically for plug-to-plug compatibility with the MAC 16 minicomputer and offers up to 4K words and up to 17 bit/word.

– – –

A new digital read head for magnetic stripe reading applications, the CRH 3101, has been announced by Pioneer Electronic Corp., Sunnyvale, Calif.

In quantities of 100 to 299, the CRH-3101 head sells for $40.

– – –

Process control that makes 95% of finished disks free from micromagnetic defects is claimed by the Plated Data Division of Chemplate Corp., Los Angeles, to allow cost reductions of up to 75% in plated magnetic disks.

Contracts

IBM's Federal Systems Division has received two contracts worth $10.5 million from the Federal Aviation Administration for programming and on-site software support and for components for the Central Computer Complex and printer subsystems.

D.R. McCord and Associates, a unit of University Computing Co., has received a $142,000 contract for seismic data processing from the U.S. Department of Interior. Under the contract, McCord will process seismic data covering 2,173 miles in the Gulf of Alaska.

Computer Machinery Corp. has received a contract for up to 13 Keyprocessing systems from the Navy's Automatic Data Processing Equipment Selection Office.

Scientific Software Corp. has received a $258,000 contract from the U.S. Geological Survey for three oil reservoir simulation programs.

American Management Systems, Inc. will develop a new teleprocessing system for the U.S. Department of Agriculture. The system will be used for reporting official meat and meat food-processing statistics.

Informatics Inc. has been selected by Nasa to operate the Nasa Scientific and Technical Information Facility in College Park, Md.

Telex Computer Products, Inc. has received a contract valued at over $1 million from the U.S. Navy for delivery of 114 Telex tape drives and controllers.

Ampex Corp. has received a $157,000 contract from Boise State College, Boise, Idaho, for installation of a computer-controlled random access audio system and related studio production equipment.

Xynetics, Inc. has been awarded a contract for three Model 1200 plotters from the Naval Electronics Systems Command.

GTE Sylvania has received a $5.3 million contract from the Federal Aviation Administration for 28 computerized en route air traffic control simulators. The systems will be used to train new controllers.

Rixon Electronics, Inc. has been awarded a Defense Communications Agency contract to lease more than 35 high-speed DS-9600 data sets over a three-year period.

The Air Force has issued Sperry Rand Corp. a $3.9 million contract modifications for the design and development of a Minuteman weapon system computer.

'Industry Must Unite'

Limitation of IBM Market Area Urged

(Continued from Page 29)

investment, and to share in the future growth of the industry.

The solution would require the industry to look ahead to the various uses of data processing in the 1976-78 time frame.

This projection indicates that primary growth will occur in medicine, education, industrial control, data communications, and, ultimately, to consumers.

IBM defines itself as a manufacturer of DP equipment and then proceeds to define DP as the handling of all data emanating from all sources.

A narrower definition might restrict IBM to the handling of business and scientific data within a single complex and specifically excluding the areas of growth noted above.

An industry group, as recommended by Sen. Philip Hart, could be established to confirm these market areas and define the proper interfaces with IBM markets.

Further, the Federal Government would be encouraged to purchase no more than 25% of its computers from IBM. This would permit other firms to share in that market until a better industry balance is achieved.

Invest Resources

Other computer manufacturers could then invest their resources into developing products for these selected market areas. IBM would continue to enjoy maximum growth in its traditional business and scientific DP markets with minimal interference.

Then the availability of earlier peripheral interface information could benefit the entire industry rather than a single segment.

Consideration has occasionally been given to forced divestiture of the IBM Service Bureau Corp., Field Service Division, Office Products Division and Components Division. These are important cost and service tools in the IBM arsenal despite their less than 15% contribution to the company's revenue. I would gladly forego such divestiture if the remainder of the program could be implemented.

It is not clear whether the program I have outlined could be imposed legislatively. Continued large purchases of IBM equipment by the government and the difficulties of the Justice Department in combating Nicholas Katzenbach's battalions of lawyers do not inspire confidence in any future success from the Executive Branch of the government.

The non-IBM segment of this growing vital industry must pull together. It must speak with one voice in a logical and unemotional way. It does not help to harangue or bluster. Goals will be not be achieved in that way.

We must evaluate the future and make it happen. We must seek the support of legislators in California, Minnesota, Ohio, Massachusetts, Texas and Florida where much of our industry is concentrated. They have a vested interest, on both a national and state scene, in the survival and growth of a competitive industry.

S.P. Eglash, involved in the computer industry for 16 years, is currently a member of executive management for a large electronics manufacturer.

How About This U.S.—IBM Deal?

By Marvin Smalheiser
Special to Computerworld

PALO ALTO, Calif. – A proposal that the government give IBM a free hand in expanding outside the U.S. in exchange for limitation of its domestic growth was suggested here as the only practical solution to the problem of IBM's dominance of the computer industry.

Frank Wagner, executive vice-president of Informatics, Inc., said that IBM might agree to such a trade-off because its greatest opportunities for growth are now overseas.

"There is probably no sensible way IBM can be broken up any more than American Telephone and Telegraph can be broken up," he emphasized. "Certainly, the majority of computer users does not want to destroy IBM.

"However, since IBM has become a de facto monopoly and can virtually be considered a public utility, it should be regulated like a utility," he continued.

"Doing so will keep the computer industry in the country strong while preserving the non-IBM part, that segment of the industry responsible for hundreds of thousands of jobs and much of the industry's technical creativity," Wagner observed.

Wagner, a veteran of 20 years in the industry, said IBM was less of an immediate threat to software firms than to hardware companies because of its great emphasis on hardware.

Firm Offers Aid in Securing GSA Listing

WASHINGTON, D.C. – Sometimes entering the huge government marketplace scares off potential vendors because of the problems associated with such a move – Washington offices, bureaucratic delays and stiff price competition.

The major part of the government computer business is handled through the General Services Administration's Automatic Data Processing Procurement Division, which utilizes the Federal Supply Schedule for listing firms with a blanket contract to do business with the government.

But because of the problems of getting listed on the GSA schedule, less than 15% of the more than 1,500 firms producing hardware or software are listed on the schedule, according to Plaisance & Webber, a new firm here formed to help computer firms overcome the problems with government marketing.

"With the utilization of less than 15% of the available suppliers, the government is not accomplishing one of the major objectives of the Federal Supply Schedule," said James B. Webber, one of the founders.

From the standpoint of computer equipment vendors, "not enough companies are reaping the benefits of government business," and those who do get on the schedule "are paying too high a price in time and expense to be there," he said.

Plaisance & Webber will aid DP firms in being placed on the schedule, by getting a solicitation for that company and preparing the response to that solicitation.

Prepare Price Lists

It will also prepare the required price lists needed for listing on the schedule and provide client companies with consulting services while they are negotiating a contract for listing on the Federal Supply Schedule.

The firm will also obtain for its clients a completed mailing list of more than 1,300 federal agency installations that have indicated an interest in products on the schedule and will monitor government procurements activity and keep the client informed of proposed contracts in his area of interest.

Orders & Installations

The First National Bank of Mobile, Ala., has installed a Burroughs B3500 in conjunction with an on-line data communications network to service savings and loan institutions. Applications will include demand deposits, commercial loans, installment loans and savings and Bank Americard.

The bank will also offer a patient billing service for medical doctors, with terminals in the doctors' offices.

The Chase Manhattan Bank, N.A. has installed a dual Control Data Corp. M1000 communications system, intended to provide front-end capability to the bank's computer utility and handle a variety of communications-oriented applications.

The Pittsburgh National Bank of Pittsburgh, Pa., has purchased a Burroughs B4700 as a replacement for its B3500. The 4700 will handle check processing and savings, demand desposits and multiservice savings.

Consolidated Papers, Inc. has ordered a Univac 1106 and 9200. The 1106 will handle an on-line order entry system as well as inventory control, statistical monitoring, personnel records, payroll processing and research and development projects. The 9200, installed in the Research and Development Division, will act as a remote terminal.

Olin-Aluminum has ordered two Univac Series 70/2s, an 1106, two 9300s and 55 Series 70 DGS Data Collection Units. Applications include complete order information, machine load scheduling, and other real-time services in an MIS for the Sheet and Plate Division. The computers will also process data for other product divisions.

The U.S. State Department has ordered three Compuscan 170 OCR systems.

Reynolds and Reynolds Co. is installing six Burroughs B4700 systems to replace six B3500s. Major applications include accounting, parts inventory control, payroll, accounts receivable and financial reporting.

The Bureau of the Census has installed two Univac 1106s as replacements for two 1107s.

Roosevelt Memorial Hospital, Chicago, is installing a Medical Data Systems Corp. computer-assisted patient history system.

J.C. Penney Co., Inc. has installed two Pertec 3700 computer output microfilm systems at its Milwaukee and Atlanta catalog distribution centers. The systems will be used to process catalog information on customers, inventory control, suppliers and catalog sales desks.

Data Graph, Inc. has ordered a Control Data Corp. 1700 system to expand its semi-automated circuit design service.

Addressograph Division of Addressograph Multigraph Corp. has received a $2.5 million order for OCR data recorders for the U.S. Postal Service. The units will be used in the Postal Service's new money order system.

DP-Based Systems Should Increase Share Of Machine Control Area to 60% by '75

ANAHEIM, Calif. – "The pressure for increased productivity to stay competitive in both product and geographic markets, combined with the rapid improvement in the quality of computer-based control systems, will double the demand for production machine control systems during the next several years."

That conclusion led General Automation to devote increasing resources to that market, according to Raymond J. Noorda, executive vice-president of the firm which recently introduced three new computer systems aimed at the machine control market [CW, Aug. 2].

"We expect production machine control systems like our new Adapt-A-Path line to account for $200 million worth of sales to machine tool users in the next four years," Noorda predicted.

General Automation expects growth rates to increase by 30% to 40% annually, from 1971's annual sales level of about $70 million, he said.

The total market for numerical control systems, including the hard-wired systems which have predominated in the past, currently exceeds $70 million annually, of which computer-based systems represent about 10%, he added.

By 1975, the total available market for all types of N/C systems is expected to be $125 million, or which computer-based systems will represent more than 60%, Noorda predicted.

A major factor contributing to the growth rate will be the entry into the market for the first time of large numbers of small machine tool shops which shied away from conventional N/C controls because of their complexity and need for large-computer backup.

"The new computer-based systems simplify the control process to such an extent that even the average shop employee can program the work," Noorda said.

General Automation already has shipped $2 million of its new production machine control equipment in 1972, Noorda stated.

In terms of unit shipments, General Automation believes the point-to-point control market, which historically has represented about two-thirds of all numerical control and machine control volume, will continue to be dominant in the next few years.

Current annual shipments of point-to-point control systems are more than 3,000 units and is expected to double by 1973 as pricing becomes more favorable and smaller machine tool users enter the market.

Continuous path and contouring control systems, which make up the remaining third of the production machine control market, are expected to enjoy a faster rate of growth in unit volume, again spurred by lower prices, superior performance and greater user demand, he said.

Current dollar value of control systems in this market is approximately $12 million annually. This is expected to grow to $25 million annually by 1975.

UCC Consolidates Service Units, Realigns Management for Utility

DALLAS – University Computing Co. has consolidated all computer service operations into the University Computing Utility, and realigned management.

David G. Thomson was named president and chief executive of the new unit and W.G. Thompson, formerly UCC vice-president and controller, was named financial officer of the new operation.

E.W. McCain Jr., formerly UCC executive vice-president, was appointed chief executive of UCC's subsidiary, Computer Leasing Co. Dean D. Thornton, formerly vice-president finance and administration, was named UCC senior vice-president and elected to the board of directors.

Executive Corner

CPI Names More CDCers

Computer Peripherals, Inc., (CPI), the new jointly owned company organized by National Cash Register Co. and Control Data Corp., has named four CDC executives to its staff.

J.A. Fasching becomes vice-president of CPI and general manager of its Card and Tape Products Division; F.J. Snell, vice-president and general manager of the Printer Products Division; and W.W. Craven, secretary of the corporation and general manager of administration. W.L. Poland was appointed assistant vice-president, printer technology, at Rochester.

Other Moves

- Bruce T. Coleman has been elected president of Boole & Babbage, Inc.
- Charles S. Lerner has been named president and William W. Walton executive vice-president of RMC, Inc., a subsidiary of the Resource Management Corp. of Bethesda.
- Lawrence Weiland has been appointed president and a director of Tri-Data Corp.

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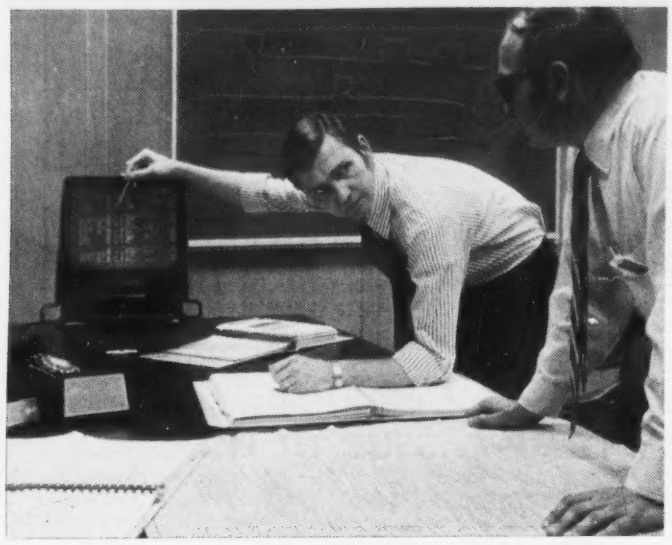

House Call Needed?

If a problem occurs in one of the 900 Series 70 computers which Univac acquired from RCA, a special Univac Systems Support Office in Cinnaminson, N.J., provides immediate telephone assistance and, if necessary, dispatches a technician to the computer site.

Here, members of the group examine the diagnostic result on a microfiche viewer. They are connected on a conference call with a Univac Series 70 customer engineer at the site.

Athletes Face Big Hurdle

PALO ALTO, Calif. – Olympic competitors planning to pop pep pills to boost performances at Munich this month will first have to face a new type of drug-detection system.

Varian/MAT GmbH, a German subsidiary of Varian Associates, received a contract from the German Olympic committee to install a special computerized analytical system to determine within minutes whether a competitor is under the influence of amphetamines or other substances which would artificially improve his performance.

Urine samples from about 200 athletes daily will be examined by a gas chromatograph. Suspicious samples subsequently will be run through a combination gas chromatograph/mass spectrometer which is coupled directly to a Varian minicomputer data system.

This instrument/computer array automatically compared the chemical characteristics of the urine sample under test with a known reference.

Olympic Oracle Getting Ready

MUNICH – The real results won't be known until some time in the first week of September but already some programmers here are predicting the performance levels for the summer Olympics.

They fed the facts and figures of Olympic track and field achievements going back as far as 1896 into an NCR Century 100 to figure this year's results.

And, according to the computer, it will take a time of 22.1 seconds to win the women's 200-meter race. But in the men's track events, the computer foresees poorer results than previously in the 400-meter race, the 400-meter hurdles and the long or broad jump.

After taking into consideration such variables as the change in altitude between Mexico City four years ago and Munich (which is lower), the computer predicts a 45-second time for the 400-meter race compared with a Mexican 43.8, a 48.6-second 400-meter hurdle time against a 48.1 result four years ago, and jumps of about 8.20 meters against the 8.90 achieved in Mexico.

'Quake' Picture Getting Clearer

LA JOLLA, Calif. – A computer model describing the way rock formations dilate under stress, used in conjunction with laboratory observations of rock deformation, has provided "the first significant step toward predicting the place, time and even magnitude of an impending earthquake," according to Dr. J.T. Cherry, principal investigator in the geophysics and materials department at Systems, Science and Software, Inc.

The computer "dilatancy model" previously developed by Cherry, plus the laboratory observations, have been used to explain readings from a region of California's San Andreas fault.

That data, recorded for an area over a period of years, and analyzed on the computer "dilatancy model" could make possible the first predictions of time, place and magnitude of future earthquakes, Cherry believes.

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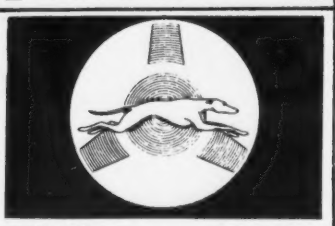

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Bell Canada Executive Appointment

LAWRENCE J. O'KEEFE

Bell Canada announces the appointment of Lawrence J. O'Keefe as Vice-President (Systems), with responsibility for the direction and further development of the Company's internal business information systems, activities and data centre operations. Mr. O'Keefe has had extensive experience in both the hardware and software aspects of computer-based information systems at IBM, the St. Regis Paper Company, ITT and Faberge Incorporated in New York City.

Calcomp Takes $12 Million Loss

Earnings Rise at Memorex, Fall at Telex

Three peripheral makers, California Computer Corp. (Calcomp), Memorex Corp. and Telex Corp., have reported sharply different earnings reports for periods ended June 30.

Of the three, Memorex was the only one posting an earnings increase. Telex, although buoyed by improved performance by the Computer Products Group, showed a decline in earnings for the first quarter.

Calcomp decided to post a $12 million loss for the year ended June 30, because of a change in accounting procedures it said was triggered by the recent IBM announcement.

The change will establish deferrals of lease acquisition, lease installation and product-development costs, and will alter the basis for evaluation of equipment held for lease and inventories, according to President Lester L. Kilpatrick.

Revenue for the year ended June 30 totaled about $53 million, up from $44.6 million last year, when Calcomp earned $2.3 million.

On a happier note, Memorex earnings for the six months rose to $334,000, or 9 cents a share, compared with a loss of $3.8 million, or 98 cents a share, in the first half of 1971.

The figures represent combined reports from both Memorex and ILC, its leasing affiliate.

Revenues climbed 35% to $69.5 million from $51.6 million in the same year-ago period.

The fact that second-quarter revenues and income were "approximately equal to first-quarter levels evidences the size and stability of Memorex's established leasing business," he added.

At Telex, revenues in the first quarter ended June 30 fell to $19.5 million from $24.6 million in the same 1971 period.

Earnings declined to $711,000, or 7 cents a share, from $1.8 million, or 17 cents a share, last year. The 1972 figures include a loss of $379,000, or 3 cents a share, from foreign operations, while in 1971 this amounted to a loss of $152,000, or 1 cent a share.

In the second quarter, the sales value of Telex equipment placed in the field rose 59%, to $18.2 million from $11.5 million in the preceding quarter.

2 Lessors Show Improved Earnings, DPF Posts $34.7 Million '72 Loss

Diebold Computer Leasing, Inc. reported increased earnings and revenues in the second quarter ended June 30, but two other leasing firms, Boothe Computer Corp. and DPF Inc., showed earning declines for the six months and year, respectively.

DPF announced a loss of $34.7 million for the year, which includes the previously announced $42.3 million depreciation charge.

At DCL, earnings rose to $840,000, or 26 cents a share, from $793,000, or 23 cents a share, in the second quarter last year.

Revenues also were up, to $9.6 million from $9.2 million in the 1971 period.

In the six months, earnings climbed to $1.6 million, or 48 cents a share, from $1.5 million, or 41 cents a share. Revenues rose to almost $19 million from almost $18 million in the year-ago period.

Foreign operations continued to make a "substantial and growing contribution" to earnings, according to President John J. Graham.

At Boothe Computer Corp., revenues and earnings were down for the six months and quarter.

In the quarter, earnings declined to $757,000, or 34 cents per share, from $972,000, or 41 cents a share, in the year-ago period. Revenues were $12.7 million, down from $15.8 million.

Six-month earnings totaled $1.2 million, or 57 cents a share, compared with $1.8 million, or 77 cents a share, in the same 1971 period.

Revenues declined to $28 million from $30.6 million a year ago.

Included in earnings is an $850,000 extraordinary gain from the sale of Booth Computer Ltd.

The major reasons for the decrease in earnings were the higher percentage of computers off-rent, the continued lower level of rates compared with last year, and continuing losses from manufacturing operations, according to Chairman D.P. Boothe, Jr.

DPF Inc. has turned in its year-end reports, and the results, including a previously announced $42.3 million depreciation charge, reveal a loss of $34.7 million, or $8.62 a share, for the year ended May 31.

Revenues declined to $42.3 million from last year's $48 million, when the leasing firm earned $5.5 million, or $1.37 per share.

Cash flow, unaffected by the depreciation charge, dropped to $28.2 million from $32.5 million in 1971. The company said it had reduced its bank and secured debt to $40.3 million from $73.5 million last year.

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Computerworld Stock Trading Summary

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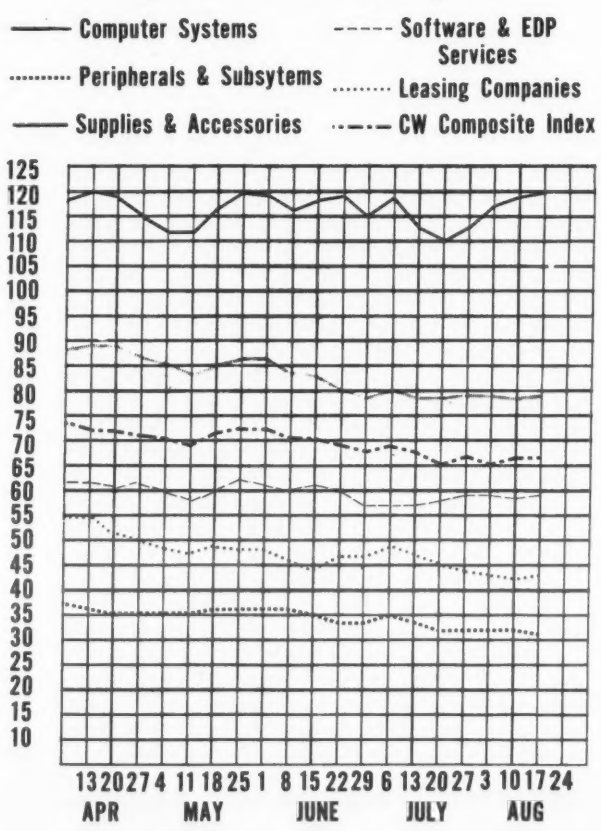
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	2 1/4	+ 1/8	+5.8
A	APPLIED DATA RES.	4- 7	4 3/4	+ 1/8	+2.7
O	APPLIED LOGIC	1- 4	2 1/2	0	0.0
N	AUTOMATIC DATA PROC	72- 99	94 1/8	-2 1/4	-2.3
O	BRANDON APPLIED SYST	1- 2	1	0	0.0
O	COMPUTER DIMENSIONS	7- 14	7 1/4	0	0.0
O	COMPUTER DYNAMICS	1- 4	1 1/4	0	0.0
O	COMPUTER NETWORK	4- 7	6 1/2	- 1/4	-3.7
N	COMPUTER SCIENCES	6- 10	6 1/2	- 1/4	-3.7
O	COMPUTER TECHNOLOGY	4- 8	4	+ 1/2	+14.2
O	COMPUTER USAGE	8- 14	8 5/8	- 7/8	-9.2
O	COMP AUTOMOT REPORTS	5- 9	5 5/8	- 3/8	-6.2
N	COMPUTING & SOFTWARE	15- 28	15 5/8	- 1/2	-3.1
O	COMRESS	1- 3	1 5/8	- 1/4	-13.3
O	COMSHARE	5- 10	7 3/4	+1 3/8	+21.5
O	DATATAB	5- 9	5 1/4	- 1/4	-4.5
O	EDP RESOURCES	3- 8	3 3/4	- 1/4	-6.2
A	ELECT COMP PROG	2- 5	2 1/8	+ 1/4	+13.3
N	ELECTRONIC DATA SYS.	43- 65	54 5/8	+1 1/4	+2.3
O	INFORMATICS	6- 11	6 7/8	+ 1/8	+1.8
O	I.O.A. DATA CORP	1- 3	2	0	0.0
A	ITEL	7- 12	9	+ 5/8	+7.4
O	KEANE ASSOCIATES	4- 7	4 1/4	0	0.0
O	KEYDATA CORP	7- 13	12	+ 1/2	+4.3
O	LOGICON	4- 9	5 7/8	- 1/2	-7.8
A	MANAGEMENT DATA	6- 10	5 7/8	+ 1/4	+4.4
O	NATIONAL CSS INC	8- 28	24 5/8	-2 3/4	-10.0
P	ON LINE SYSTEMS INC	8- 20	20 5/8	+ 5/8	+3.1
N	PLANNING RESEARCH	10- 17	10 1/4	- 1/8	-1.2
O	PROGRAMMING METHODS	20- 24	21 3/4	- 3/8	-1.6
O	PROGRAMMING & SYS	1- 2	1 3/8	+ 1/8	+10.0
O	SCIENTIFIC COMPUTERS	2- 4	2 1/4	- 1/8	-5.2
O	SIMPLICITY COMPUTER	1- 5	3 3/4	+ 3/4	+25.0
O	TBS COMPUTER CENTERS	4- 6	4 5/8	- 1/8	-2.6
O	TRACOR COMPUTING	2- 3	1 1/2	0	0.0
O	TYMSHARE INC	7- 10	10 3/4	+1 3/4	+19.4
O	UNITED DATA CENTER	5- 8	7 1/4	+ 1/2	+7.4
N	UNIVERSITY COMPUTING	14- 26	14 3/4	- 1/8	-0.8
A	URS SYSTEMS	6- 10	8 5/8	- 1/8	-1.4
O	VORTEX CORP	2- 5	3 1/2	+ 1/2	+16.6
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	34- 49	46	0	0.0
O	ADVANCED MEMORY SYS	12- 23	18	- 3/4	-4.0
N	AMPEX CORP	6- 15	6 1/4	0	0.0
O	ANDERSON JACOBSON	5- 8	4 7/8	- 1/8	-2.5
O	ATLANTIC TECHNOLOGY	1- 11	2 3/4	- 1/4	-8.3
A	BOLT,BERANEK & NEW	5- 21	19 5/8	-1 1/8	-5.4
N	BUNKER-RAMO	9- 14	11 5/8	+ 5/8	+5.6
A	CALCOMP	13- 25	13 1/8	-4 5/8	-26.0
O	CENTRONICS DATA COMP	11- 53	41	-2 1/2	-5.7
O	COGNITRONICS	3- 5	3 1/2	+ 1/8	+3.7
O	COMPUTER COMMUN.	1- 7	2 1/2	- 1/4	-9.0
A	COMPUTER EQUIPMENT	3- 4	2 3/4	- 1/8	-4.3
O	COMPUTER MACHINERY	7- 13	9 1/2	- 5/8	-6.1
A	COMPUTEST	4- 9	4 1/4	- 3/8	-8.1
A	DATA PRODUCTS CORP	4- 7	4	0	0.0
O	DATA RECOGNITION	2- 5	2	- 1/4	-11.1
O	DATA TECHNOLOGY	2- 5	2 3/8	- 1/4	-9.5
O	DI/AN CONTROLS	0- 8	5	- 3/8	-6.9
O	DIGITRONICS	2- 4	2 1/2	+ 1/4	+11.1
N	ELECTRONIC M & M	4- 8	4	- 1/2	-11.1
O	FABRI-TEK	2- 5	3 5/8	+ 3/4	+26.0
O	GENERAL COMPUTER SYS	7- 16	11 1/2	- 1/2	-4.1
N	GENERAL ELECTRIC	59- 70	67	-1 5/8	-2.3
N	HAZELTINE CORP	9- 13	9 1/2	+ 1/4	+2.7
O	INFOREX INC	28- 47	26	-5	-16.1
O	INFORMATION DISPLAYS	1- 5	1 1/2	- 1/8	-7.6
A	LUNDY ELECTRONICS	9- 14	10 1/2	+ 1/4	+2.4
O	MANAGEMENT ASSIST	1- 2	5/8	0	0.0
N	MEMOREX	18- 38	19 3/4	-1 1/2	-7.0
A	MILGO ELECTRONICS	17- 44	27	-5 5/8	-17.2
N	MOHAWK DATA SCI	17- 27	18 7/8	- 1/4	-1.3
O	OPTICAL SCANNING	7- 16	11	+1	+10.0
O	PERTEC CORP	8- 17	9 1/2	+1 1/4	+15.1
O	PHOTON	7- 15	10 7/8	- 1/2	-4.3
A	POTTER INSTRUMENT	9- 21	11	+ 3/4	+7.3
O	PRECISION INST.	6- 13	6	- 3/4	-11.1
O	RECOGNITION EQUIP	8- 15	8 1/2	+ 1/2	+6.2
N	SANDERS ASSOCIATES	13- 21	15	+ 1/2	+3.4
O	SCAN DATA	7- 13	8 5/8	+1 1/8	+15.0
O	STORAGE TECHNOLOGY	17- 39	29 3/4	-1 1/2	-4.7
O	SYCOR INC	7- 11	11	+1 1/4	+12.8
O	TALLY CORP.	8- 15	10 7/8	- 1/8	-1.1
N	TEKTRONIX INC	34- 64	57	-4 1/8	-6.7
N	TELEX	6- 15	7 1/2	- 3/8	-4.7
O	WILTEK INC	10- 26	16 1/2	-2	-10.8
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	6- 9	6	+ 1/2	+9.0
A	BARRY WRIGHT	9- 14	12 7/8	- 1/2	-3.7
A	DATA DOCUMENTS	17- 26	19 1/8	- 5/8	-3.1
O	DUPLEX PRODUCTS INC	8- 16	8 1/4	0	0.0
N	ENNIS BUS. FORMS	7- 10	8 7/8	- 3/4	-9.8
O	GRAHAM MAGNETICS	15- 27	18 1/4	+1	+5.7
O	GRAPHIC CONTROLS	12- 15	12 1/2	0	0.0
N	3M COMPANY	76- 85	84 1/2	+1 1/2	+1.8
O	MOORE BUS. FORMS	42- 56	56 1/2	+ 5/8	+1.1
N	NASHUA CORP	48- 60	60 1/8	+2 7/8	+5.0
O	REYNOLDS & REYNOLD	37- 77	45	+2 3/4	+6.5
O	STANDARD REGISTER	14- 20	16 3/4	+ 3/4	+4.6
O	TAB PRODUCTS CO	14- 17	16 1/2	0	0.0
N	UARCO	22- 28	21 3/4	- 1/4	-1.1
A	WABASH MAGNETICS	7- 11	8 1/4	+ 1/2	+6.4
N	WALLACE BUS FORMS	22- 26	22 3/8	+ 1/8	+0.5
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	147-226	215 7/8	-8 5/8	-3.8
N	COLLINS RADIO	14- 20	15 1/8	-1	-6.2
N	CONTROL DATA CORP	43- 78	74 3/4	+6 1/4	+9.1
O	DATA GENERAL CORP	56-115	104	-8	-7.1
O	DIGITAL COMP CONTROL	9- 25	9 3/4	+ 3/4	+8.3
N	DIGITAL EQUIPMENT	72-101	95	+ 1/2	+0.5
N	ELECTRONIC ASSOC.	6- 13	10 1/4	+1 3/8	+15.4
A	ELECTRONIC ENGINEER.	7- 14	7 3/4	0	0.0
N	FOXBORO	26- 41	30 1/4	+1 3/4	+4.3
O	GENERAL AUTOMATION	13- 34	32	+ 1/2	+1.5
O	GRI COMPUTER CORP	3- 5	4	+ 1/4	+6.6
N	HEWLETT-PACKARD CO	46- 77	73 1/2	- 1/4	-0.3
N	HONEYWELL INC	130-170	159 1/4	-8 3/8	-4.9
N	IBM	333-426	413 1/4	-10 1/4	-2.4
O	INTERDATA INC	8- 16	13 1/4	+ 1/8	+0.9
O	MICRODATA CORP	5- 10	7 3/4	- 1/2	-6.0
N	NCR	29- 35	32 3/8	+2 1/8	+7.0
N	RAYTHEON CO	33- 47	33 1/4	+ 5/8	+1.9
N	SPERRY RAND	30- 46	46 3/8	+1 3/8	+3.0
A	SYSTEMS ENG. LABS	10- 16	11	- 1/2	-4.3
N	VARIAN ASSOCIATES	14- 22	21 1/4	+1	+4.9
N	VICTOR COMPTOMETER	15- 24	21 1/4	- 1/8	-0.5
N	WANG LABS.	34- 61	40	+2 3/8	+6.3
N	XEROX CORP	121-172	164 5/8	-4 1/4	-2.5
	LEASING COMPANIES				
A	BOOTHE COMPUTER	5- 18	6 1/8	- 1/2	-7.5
O	BRESNAHAN COMP.	2- 3	2 1/8	+ 1/4	+13.3
O	COMDISCO INC	3- 18	16	0	0.0
O	COMPUTER EXCHANGE	1- 3	1 1/4	0	0.0
A	COMPUTER INVSTRS GRP	8- 14	9 5/8	- 1/4	-2.5
N	DPF INC	5- 13	5 3/4	+ 5/8	+12.1
M	DATRONIC RENTAL	2- 4	2	- 1/4	-11.1
A	DCL INC	5- 10	4 7/8	- 1/8	-2.5
A	DEARBORN-STORM	17- 26	17 1/8	- 1/2	-2.8
A	DPA, INC.	5- 8	5 3/4	- 1/8	-2.1
A	GRANITE MGT	6- 11	6 1/4	- 1/8	-1.9
A	GREYHOUND COMPUTER	6- 11	6 7/8	0	0.0
N	LEASCO CORP	17- 24	21 1/2	+2	+10.2
O	LEASPAC CORP	9- 15	9 1/2	+ 1/2	+5.5
O	LECTRO MGT INC	1- 4	1 1/4	+ 1/4	+25.0
O	NCC INDUSTRIES	6- 11	6 1/8	- 5/8	-9.2
A	ROCKWOOD COMPUTER	2- 7	2 3/4	0	0.0
O	SYSTEMS CAPITAL	3- 20	12 3/4	-3 5/8	-22.1
N	U.S. LEASING	19- 33	30 1/2	+1 3/8	+4.7

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



Earnings Reports

SINGER
Three Months Ended June 30

	1972 (000)	a1971 (000)
Shr Ernd	$1.05	$.75
Revenue	552,271	512,023
Earnings	19,093	14,079
6 Mo Shr	2.06	1.56
Revenue	1,077,131	999,014
Earnings	38,680	29,024

a-Restated to reflect the pooling-of-interests with Mitchell Co.

NCR
Three Months Ended June 30

	1972	1971
Shr Ernd	$.12	$.31
Revenue	429,789,723	483,672,278
Earnings	2,799,000	7,007,000
6 Mo Shr	.....	.57
Revenue	711,291,000	711,011,000
Earnings	(4,015,000)	12,539,000

COMPUTER INVESTORS GROUP
Three Months Ended June 30

	1972	a1971
Shr Ernd	$.28	$.25
Revenue	3,866,895	3,061,786
Spec Cred	.....	b29,000
Earnings	587,899	510,970

a-Restated. b-Gain on repurchase of a portion of the company's debentures at less than the principal amount.

RAYTHEON
Three Months Ended July 2

	1972	a1971
bShr Ernd	$.67	$.63
Revenue	379,664,000	333,603,000
Earnings	10,926,000	10,212,000
b6 Mo Shr	1.30	1.24
Revenue	738,253,000	658,824,000
Earnings	21,112,000	19,710,000

a-Restated to reflext acquisition of Iowa Manufacturing Co., March 15, 1972 on a pooling-of-interests basis. b-Fully diluted.

SPERRY RAND
Three Months Ended June 30

	1972	a1971
Shr Ernd	$.52	$.38
Revenue	499,729,000	414,214,000
Earnings	17,869,000	13,208,000

a-Restated.

ANDERSON JACOBSON
Three Months Ended June 30

	1972	1971
Shr Ernd	$.03	$.01
Revenue	1,197,252	824,711
Spec Cred	36,694	.....
Earnings	87,512	23,135

COMPUTAX SERVICES
Nine Months Ended July 2

	1972	1971
Shr Ernd	$1.30	$1.11
Revenue	14,768,682	12,903,898
Earnings	1,635,790	1,399,767

TERMINAL DATA
Nine Months Ended June 30

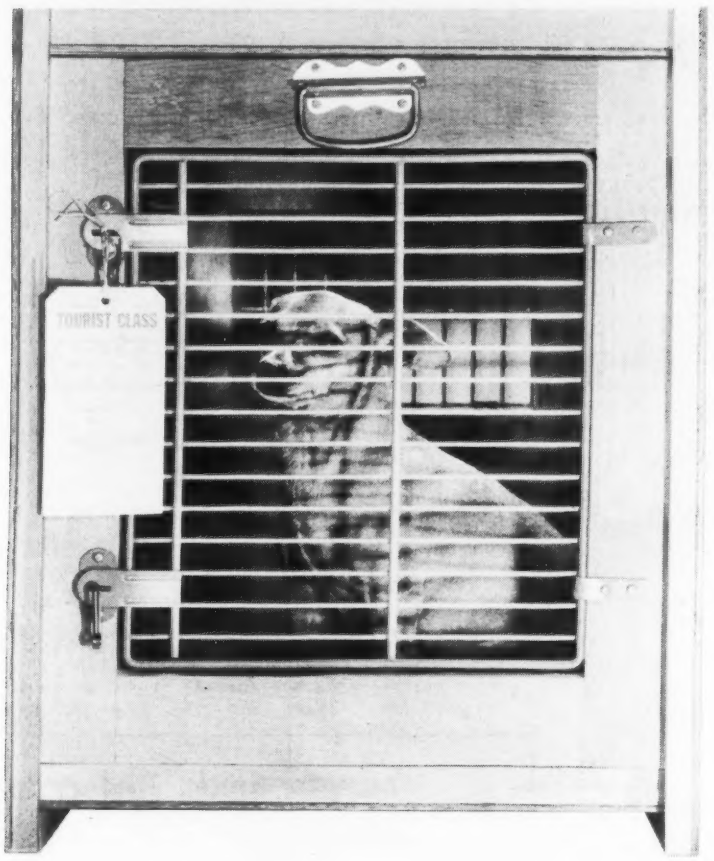
	1972	1971
Shr Ernd	$.57	$(.11)
Revenue	2,647,543	1,406,336
Spec Item	189,313	.....
Earnings	394,401	(71,197)

NATIONAL INFORMATION SYSTEMS
Six Months Ended June 30

	1972	a1971
Shr Ernd	$.05	$.04
Revenue	3,977,000	2,974,000
Tax Cred	.....	28,000
Earnings	191,000	162,000

a-Restated to reflect the acquisition of Computer Investment Leasing Corp. on a pooling-of-interests basis in December 1971.

On the road, computer tape can lead a dog's life.



Far too often, tape in shipment takes a lot of kicking around. It gets shoved and bounced around inside a sweltering-hot van. Or it sits shivering on a cold, drafty warehouse dock.

Many tapes can't survive this kind of treatment. By the time they reach your EDP center, they can't remember their own names—much less retain all of the valuable data you've trusted them with.

Epoch 4 can. It's made to take rough treatment in stride. It has a binder system that's 8000% tougher than that of any other tape on the market.

Epoch 4 can withstand heat in excess of 175 degrees F. without degradation. It can take humidity with no sweat. And hold its own in cold that would make a Husky curl up in knots.

You'll have fewer worries about cinches, pleats, pack pressure and subsequent loss of data-retaining capabilities when you ship Epoch 4 tape. You have our 20-year guarantee on it.

GRAHAM MAGNETICS

GRAHAM, TEXAS 76046